

MVA Optimization Using Correlation Based Method

Progress Report on Tau Final States of TTTT

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Outline

- 1 BDT Overall Strategy
- 2 1Tau1L
- 3 1Tau2OS
- 4 2Tau1L
- 5 Event Yield
- 6 Results of all training
 - 1tau2os
 - 2tau1l

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Correlation based optimazation strategy

- Start with 50 leading input variables, choose the one with least number of input variables yet good performance(60% training)
- Remove bjetsL and bjetsT related variables
- Find the **largest** correlation pair and remove one variable with smaller separation power in the pair
- Repeat the last step until there is only one variable left
- Plot the AUC as a function of number of input variables

TMVA Setup

- ROOT version

- Switched to ROOT6.12/07, TMVA version 4.3.0
- New TMVA version comes with new feature

- Training setup

- Signal: TTTT_TuneCP5;
- Background: all bg except H and HH and minor ones
- 60% goes to training and 40% goes to testing
- Global weight and event weight same in event yield calculation
- have added more interesting variables:
 - sphericity, aplanarity
 - added some nonjets variables
- Dealing with negative weight events :InverseBoostNegWeights(Boost With inverse boostweight), Boost With inverse boostweight(Pair events with negative and positive weights in training sample and *annihilate* them)
- 4 boosting algorithm: BDT(A), BDTG, BDTB, BDTD (all use the default InverseBoostNegWeights)

- Hyperparameters

- Using the default

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Input variable sets

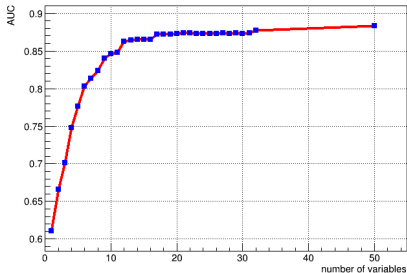
1tau1l		
1: jets_bScore	0.2761	
2: jets_4largestBscoreSum	0.2611	
3: bjetsM_num	0.2373	
4: bjetsM_3pt	0.2363	
5: bjetsL_num	0.2265	
6: bjetsL_3pt	0.2079	
7: bjetsL_4pt	0.1936	
8: jets_7pt	0.1804	
9: jets_number	0.1791	
10: toptagger_HT	0.1697	
11: bjetsL_HT	0.1651	
12: toptagger_transMass	0.1635	
13: bjetsL_invariantMass	0.1567	
14: bjetsL_transMass	0.1515	
15: bjetsM_invariantMass	0.1477	
16: jets_5pt	0.1461	
17: bjetsT_num	0.1429	
18: jets_8pt	0.1405	
19: bjetsT_3pt	0.1393	
20: toptagger_invariantMass	0.1357	
21: toptagger_num	0.1351	
22: bjetsM_HT	0.1307	
23: toptagger_2pt	0.1295	
24: toptagger_minDeltaR_v1	0.1195	
25: jets_5pt	0.1172	
26: bjetsM_transMass	0.1153	
27: jets_transMass	0.1116	
28: jets_rationHT_4toRest	0.1109	
29: jets_HT	0.1048	
30: nonbjetsM_num	0.1015	
31: bjetsT_invariantMass	0.09939	
32: bjetsL_minDeltaR	0.09777	
33: bjetsM_4pt	0.09661	
34: bjetsL_2pt	0.09659	
35: jets_4pt	0.09183	
36: bjetsT_HT	0.09058	
37: jets_9pt	0.08548	
38: bjetsT_transMass	0.08038	
39: nonbjetsT_num	0.07897	
40: nonbjetsM_4pt	0.07253	
41: bjetsM_2pt	0.07138	
42: bjetsM_minDeltaR	0.07062	
43: nonbjetsT_4pt	0.06607	
44: jets_3pt	0.06277	
45: bjetsT_2pt	0.06104	
46: toptagger_3pt	0.05575	
47: bjetsL_1pt	0.05548	
48: bjetsT_minDeltaR	0.05531	
49: toptagger_MHT	0.05152	
50: bjetsM_1pt	0.04679	

1tau1l		
1: jets_4largestBscoreSum	0.2611	
2: bjetsM_3pt	0.2363	
3: jets_7pt	0.1804	
4: jets_6pt	0.1461	
5: jets_8pt	0.1405	
6: toptagger_invariantMass	0.1357	
7: toptagger_minDeltaR_v1	0.1195	
8: jets_rationHT_4toRest	0.1109	
9: bjetsM_4pt	0.09661	
10: jets_9pt	0.08548	
11: nonbjetsM_4pt	0.07253	
12: bjetsM_2pt	0.07138	
13: bjetsM_minDeltaR	0.07062	
14: jets_3pt	0.06277	
15: toptagger_3pt	0.05575	
16: toptagger_MHT	0.05152	
17: bjetsM_1pt	0.04679	

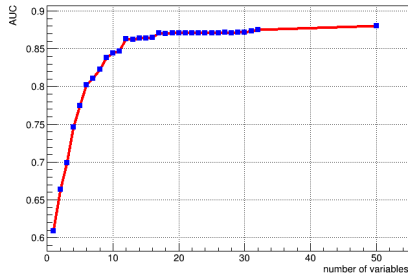
1tau1l		
1: bjetsM_3pt	0.2363	
2: jets_6pt	0.1461	
3: toptagger_minDeltaR_v1	0.1195	
4: jets_rationHT_4toRest	0.1109	
5: bjetsM_4pt	0.09661	
6: jets_9pt	0.08548	
7: nonbjetsM_4pt	0.07253	
8: bjetsM_minDeltaR	0.07062	
9: jets_3pt	0.06277	
10: toptagger_3pt	0.05575	
11: toptagger_MHT	0.05152	
12: bjetsM_1pt	0.04679	

AUC results

AUC vs No. of Variables (BDT)



AUC vs No. of Variables (BDTG)

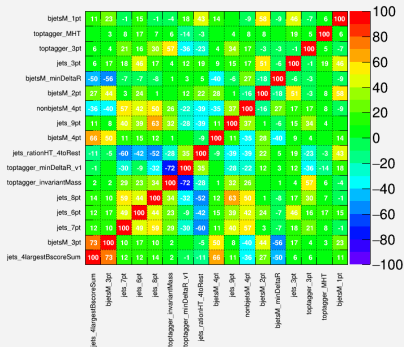


- variable list 15 is going to be our final input variables for BDT
- BDTG and BDT has very similar performance

17 input variables set

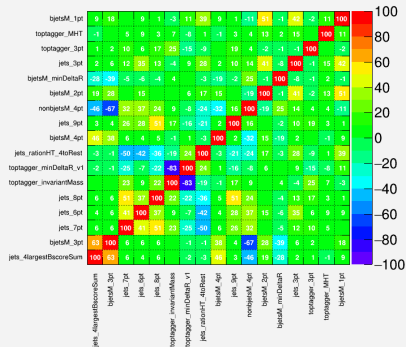
Correlation Matrix (signal)

(17 input variables)



Correlation Matrix (background)

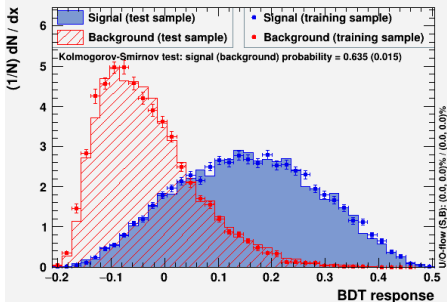
(17 input variables)



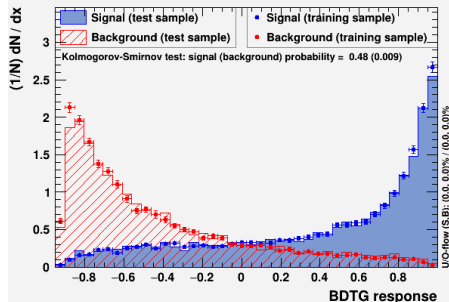
- in parentheses below the title is the number of input variable for training
- this is the correlation matrix for training with 17 input variables

17 input variables set

TMVA overtraining check for classifier: BDT(17 inputs)



TMVA overtraining check for classifier: BDTG(17 inputs)



- number in the parenthese after the title indicates the number of input variables
- so this is the overtraining check plot for 17 input variables

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Input variables

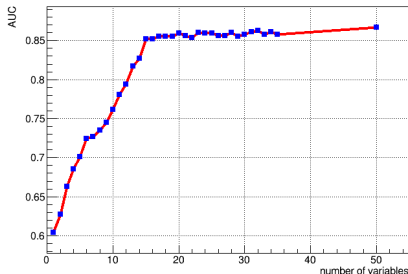
1tau2os		
1: jets_bScore	0.3179	
2: jets_4largestBscoreSum	0.309	
3: bjetsM_num	0.2818	
4: bjetsM_3pt	0.2801	
5: bjetsL_num	0.2653	
6: bjetsL_3pt	0.24	
7: toptagger_HT	0.1981	
8: bjetsL_4pt	0.191	
9: bjetsL_minDeltaR	0.1635	
10: jets_number	0.1591	
11: jets_6pt	0.1555	
12: jets_rationHT_4toRest	0.1505	
13: jets_5pt	0.1471	
14: toptagger_transMass	0.1362	
15: bjetsT_num	0.1359	
16: bjetsT_3pt	0.1329	
17: toptagger_invariantMass	0.1262	
18: bjetsM_minDeltaR	0.1222	
19: bjetsL_invariantMass	0.119	
20: toptagger_num	0.1103	
21: bjetsL_HT	0.1083	
22: jets_HT	0.1078	
23: toptagger_MHT	0.1057	
24: bjetsM_invariantMass	0.1042	
25: bjetsM_4pt	0.09708	
26: bjetsL_transMass	0.09473	
27: jets_7pt	0.09376	
28: bjetsL_tausF_minDeltaR	0.09017	
29: jets_aplanarity	0.08952	
30: toptagger_minDeltaR_v1	0.08646	
31: bjetsM_HT	0.08064	
32: toptagger_2pt	0.08034	
33: toptagger_1pt	0.07936	
34: jets_4pt	0.07908	
35: bjetsT_invariantMass	0.07725	
36: bjetsT_minDeltaR	0.07591	
37: tausF_HT	0.07326	
38: bjetsM_transMass	0.07208	
39: tausL_HT	0.06956	
40: bjetsT_HT	0.06739	
41: jets_tausF_minDeltaR	0.06735	
42: tausL_MHT	0.06648	
43: nonbjetsT_num	0.06614	
44: tausF_MHT	0.06609	
45: jets_5pt	0.06521	
46: tauL_1pt	0.0638	
47: bjetsL_2pt	0.06353	
48: nonbjetsM_num	0.06346	
49: jetL_minDeltaR	0.06313	
50: jets_average_deltaR	0.06268	

1tau2os		
1: jets_bScore	0.3179	
2: jets_4largestBscoreSum	0.309	
3: bjetsM_num	0.2818	
4: bjetsM_3pt	0.2801	
5: toptagger_HT	0.1981	
6: jets_number	0.1591	
7: jets_6pt	0.1555	
8: jets_rationHT_4toRest	0.1505	
9: jets_5pt	0.1471	
10: toptagger_transMass	0.1362	
11: toptagger_invariantMass	0.1262	
12: bjetsM_minDeltaR	0.1222	
13: toptagger_num	0.1103	
14: jets_HT	0.1078	
15: toptagger_MHT	0.1057	
16: bjetsM_invariantMass	0.1042	
17: bjetsM_4pt	0.09708	
18: jets_7pt	0.09376	
19: jets_aplanarity	0.08952	
20: toptagger_minDeltaR_v1	0.08646	
21: bjetsM_HT	0.08064	
22: toptagger_2pt	0.08034	
23: toptagger_1pt	0.07936	
24: jets_4pt	0.07908	
25: tausF_HT	0.07326	
26: bjetsM_transMass	0.07208	
27: tausL_HT	0.06956	
28: jets_tausF_minDeltaR	0.06735	
29: tausL_MHT	0.06648	
30: tausF_MHT	0.06609	
31: jets_3pt	0.06521	
32: tauL_1pt	0.0638	
33: nonbjetsM_num	0.06346	
34: jetL_minDeltaR	0.06313	
35: jets_average_deltaR	0.06268	

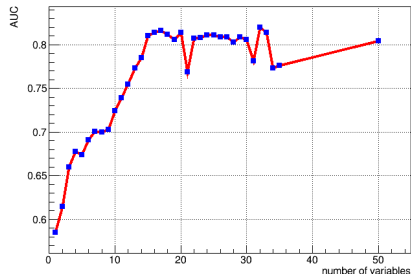
1tau2os		
1: bjetsM_3pt	0.2801	
2: jets_6pt	0.1555	
3: bjetsM_minDeltaR	0.1222	
4: toptagger_MHT	0.1057	
5: bjetsM_4pt	0.09708	
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AUC results

AUC vs No. of Variables (BDT)



AUC vs No. of Variables (BDTG)

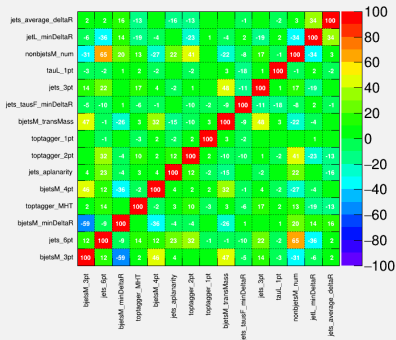


- variable list 15 is going to be our final input variables for BDT
- not sure why BDT_G plot is not smooth? I am guessing BDTG is very sensitive to statistic compared to BDT

15 input variables set

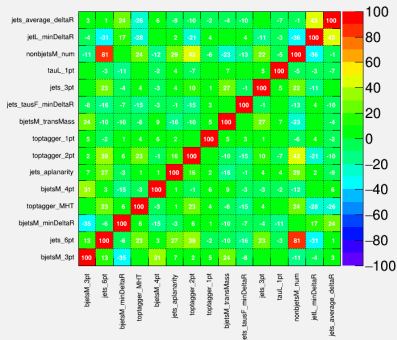
Correlation Matrix (signal)

(15 input variables)



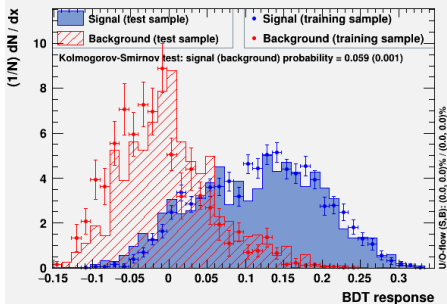
Correlation Matrix (background)

(15 input variables)

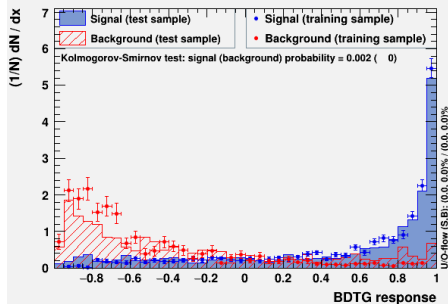


15 input variables set

TMVA overtraining check for classifier: BDT(15 inputs)



TMVA overtraining check for classifier: BDTG(15 inputs)

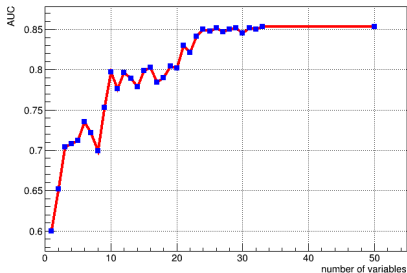


Outline

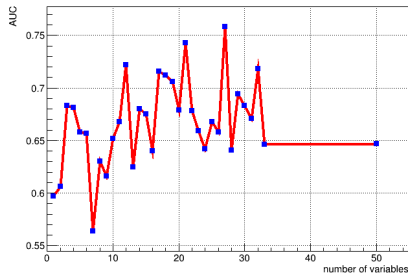
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AUC results

AUC vs No. of Variables (BDT)



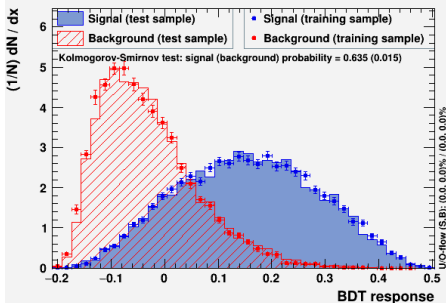
AUC vs No. of Variables (BDTG)



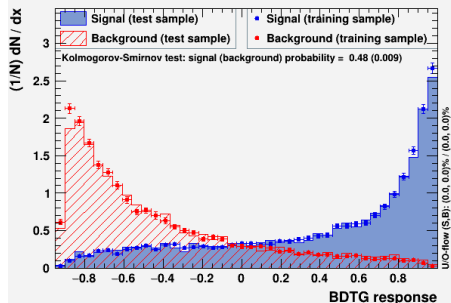
- not sure if the fluctuation is due to low statistic or overtraining
- it seems BDTG is performing poorly for lower statistics

17 input variables

TMVA overtraining check for classifier: BDT(17 inputs)



TMVA overtraining check for classifier: BDTG(17 inputs)



Next Step

- Add more variables
- add various correction
- Hyperparameter optimization (SS AN)
- maybe loosen baseline selection for higher statistics

Backup

back up

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EventSelection

- MET fillters
- HLT requirements
 - `HLT_PFHT450_SixJet40_BTagCSV_p056==1,`
`HLT_PFHT400_SixJet30_DoubleBTagCSV_p056==1`
 - `HLT_PFJet450`
- loose preselection
 - `tausL.size()>0, jets.size()>2( fixed here), bjetsL.size()>1`
 - `HT>400`
- Subchannel requirements

MC reweighting

- genWeight
- prefireWeight
- PileUp reweighting

Event Yield

1Tau0L
raw entries:
TTTT = 237121.000000
TT = 45781.000000
TTX = 59520.000000
VV = 9.000000
VVV = 100.000000
WJets = 0.000000
DY = 0.000000
singleTop = 3795.000000
TX = 7749.000000
QCD = 315.000000
background = 7787.433668

1Tau0L
weighted:
TTTT = 1727.402161
TT = 12808721.094352
TTX = 76752.367739
VV = 715.464884
vvv = 13.558634
WJets = 0.000000
DY = 0.000000
singleTop = 178.302566
TX = 7694.366882
QCD = 279.102358
background = 13822.328266

1Tau0L
scaled to LUMI:
TTTT = 9.463674
TT = 6151.841389
TTX = 237.177114
VV = 0.138518
vvv = 1.103006
WJets = 0.000000
DY = 0.000000
singleTop = 115.069084
TX = 13.340787
QCD = 7303.658368
background = 13822.328266

1Tau2L
raw entries:
TTTT = 36053.000000
TT = 670.000000
TTX = 5439.000000
VV = 0.000000
VVV = 6.000000
WJets = 0.000000
DY = 0.000000
singleTop = 2286.000000
TX = 800.000000
QCD = 0.000000
background = 21.088795

1Tau2L
weighted:
TTTT = 277.013738
TT = 49317.260154
TTX = 5682.610249
VV = 0.000000
vvv = 0.725201
WJets = 0.000000
DY = 0.000000
singleTop = 114.770694
TX = 799.258622
QCD = 0.000000
background = 46.837393

1Tau2L
scaled to LUMI:
TTTT = 1.517636
TT = 31.243461
TTX = 14.239847
VV = 0.000000
vvv = 0.106212
WJets = 0.000000
DY = 0.000000
singleTop = 0.292115
TX = 0.955757
QCD = 0.000000
background = 46.837393

1Tau3L
raw entries:
TTTT = 2215.000000
TT = 0.000000
TTX = 321.000000
VV = 0.000000
VVV = 0.000000
WJets = 0.000000
DY = 0.000000
singleTop = 22.000000
TX = 27.000000
QCD = 0.000000
background = 0.882240

1Tau3L
weighted:
TTTT = 16.702130
TT = 0.000000
TTX = 323.867294
VV = 0.000000
vvv = 0.000000
WJets = 0.000000
DY = 0.000000
singleTop = 1.096257
TX = 27.411090
QCD = 0.000000
background = 0.840136

1Tau3L
scaled to LUMI:
TTTT = 0.091504
TT = 0.000000
TTX = 0.803764
VV = 0.000000
vvv = 0.000000
WJets = 0.000000
DY = 0.000000
singleTop = 0.002790
TX = 0.033581
QCD = 0.000000
background = 0.840136

Event Yield

1Tau1Mu

raw entries:

TTTT = 96510.000000
 TT = 15790.000000
 TTX = 17317.000000
 VV = 6.000000
 VVV = 9.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 2222.000000
 TX = 2782.000000
 QCD = 0.000000
 background = 80.029567

1Tau1Mu

weighted:

TTTT = 750.823160
 TT = 1988643.247954
 TTX = 20245.956260
 VV = 465.543882
 vvv = 0.607881
 WJets = 0.000000
 DY = 0.000000
 singleTop = 114.866833
 TX = 2706.830801
 QCD = 0.000000
 background = 1081.337876

1Tau1Mu

scaled to LUMI:

TTTT = 4.113429
 TT = 1005.211880
 TTX = 56.540381
 VV = 0.078666
 vvv = 0.079142
 WJets = 0.000000
 DY = 0.000000
 singleTop = 15.823899
 TX = 3.603908
 QCD = 0.000000
 background = 1081.337876

1Tau1E

raw entries:

TTTT = 77566.000000
 TT = 13243.000000
 TTX = 14947.000000
 VV = 2.000000
 VVV = 19.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 2857.000000
 TX = 2322.000000
 QCD = 2.000000
 background = 82.771878

1Tau1E

weighted:

TTTT = 595.308610
 TT = 1714597.442319
 TTX = 17514.991634
 VV = 414.892860
 vvv = 1.584673
 WJets = 0.000000
 DY = 0.000000
 singleTop = 122.716495
 TX = 2319.020958
 QCD = 2.174466
 background = 939.704393

1Tau1E

scaled to LUMI:

TTTT = 3.261433
 TT = 864.721378
 TTX = 48.748242
 VV = 0.032859
 vvv = 0.214777
 WJets = 0.000000
 DY = 0.000000
 singleTop = 20.507983
 TX = 3.120045
 QCD = 2.359110
 background = 939.704393

1Tau1L

raw entries:

TTTT = 174076.000000
 TT = 29033.000000
 TTX = 32264.000000
 VV = 8.000000
 VVV = 28.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 5079.000000
 TX = 5104.000000
 QCD = 2.000000
 background = 162.801445

1Tau1L

weighted:

TTTT = 1346.131770
 TT = 3703240.690273
 TTX = 37760.947894
 VV = 880.436742
 vvv = 2.192554
 WJets = 0.000000
 DY = 0.000000
 singleTop = 237.583328
 TX = 5025.851758
 QCD = 2.174466
 background = 2021.042269

1Tau1L

scaled to LUMI:

TTTT = 7.374862
 TT = 1869.933258
 TTX = 105.288623
 VV = 0.111525
 vvv = 0.293919
 WJets = 0.000000
 DY = 0.000000
 singleTop = 36.331883
 TX = 6.723952
 QCD = 2.359110
 background = 2021.042269

Event Yield

1Tau2OS

raw entries:

TTTT = 23961.000000
 TT = 643.000000
 TTX = 4050.000000
 VV = 0.000000
 VVV = 4.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 1971.000000
 TX = 544.000000
 QCD = 0.000000
 background = 16.543800

1Tau2OS

weighted:

TTTT = 182.618180
 TT = 46463.399858
 TTX = 4118.349976
 VV = 0.000000
 vvv = 0.584920
 WJets = 0.000000
 DY = 0.000000
 singleTop = 99.430589
 TX = 545.692495
 QCD = 0.000000
 background = 40.979358

1Tau2OS

scaled to LUMI:

TTTT = 1.000484
 TT = 29.721410
 TTX = 10.264518
 VV = 0.000000
 vvv = 0.085810
 WJets = 0.000000
 DY = 0.000000
 singleTop = 0.253072
 TX = 0.654548
 QCD = 0.000000
 background = 40.979358

1Tau2SS

raw entries:

TTTT = 12092.000000
 TT = 27.000000
 TTX = 1389.000000
 VV = 0.000000
 VVV = 2.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 315.000000
 TX = 256.000000
 QCD = 0.000000
 background = 4.544995

1Tau2SS

weighted:

TTTT = 94.395558
 TT = 2853.860295
 TTX = 1564.260273
 VV = 0.000000
 vvv = 0.140281
 WJets = 0.000000
 DY = 0.000000
 singleTop = 15.340105
 TX = 253.566127
 QCD = 0.000000
 background = 5.858035

1Tau2SS

scaled to LUMI:

TTTT = 0.517152
 TT = 1.522051
 TTX = 3.975329
 VV = 0.000000
 vvv = 0.020403
 WJets = 0.000000
 DY = 0.000000
 singleTop = 0.039044
 TX = 0.301209
 QCD = 0.000000
 background = 5.858035

1Tau2L

raw entries:

TTTT = 36053.000000
 TT = 670.000000
 TTX = 5439.000000
 VV = 0.000000
 VVV = 6.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 2286.000000
 TX = 800.000000
 QCD = 0.000000
 background = 21.088795

1Tau2L

weighted:

TTTT = 277.013738
 TT = 49317.260154
 TTX = 5682.610249
 VV = 0.000000
 vvv = 0.725201
 WJets = 0.000000
 DY = 0.000000
 singleTop = 114.770694
 TX = 799.258622
 QCD = 0.000000
 background = 46.837393

1Tau2L

scaled to LUMI:

TTTT = 1.517636
 TT = 31.243461
 TTX = 14.239847
 VV = 0.000000
 vvv = 0.106212
 WJets = 0.000000
 DY = 0.000000
 singleTop = 0.292115
 TX = 0.955757
 QCD = 0.000000
 background = 46.837393

Event Yield

2Tau1E

raw entries:

TTTT = 2180.000000
 TT = 84.000000
 TTX = 1025.000000
 VV = 0.000000
 VVV = 0.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 267.000000
 TX = 230.000000
 QCD = 0.000000
 background = 3.241680

2Tau1E

weighted:

TTTT = 16.596552
 TT = 8862.153584
 TTX = 1066.149400
 VV = 0.000000
 vvv = 0.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 27.158919
 TX = 225.444790
 QCD = 0.000000
 background = 7.559703

2Tau1E

scaled to LUMI:

TTTT = 0.090925
 TT = 4.823582
 TTX = 2.390926
 VV = 0.000000
 vvv = 0.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 0.069125
 TX = 0.276070
 QCD = 0.000000
 background = 7.559703

2Tau1Mu

raw entries:

TTTT = 2774.000000
 TT = 98.000000
 TTX = 1122.000000
 VV = 0.000000
 VVV = 0.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 264.000000
 TX = 273.000000
 QCD = 0.000000
 background = 3.476008

2Tau1Mu

weighted:

TTTT = 21.142830
 TT = 11436.690755
 TTX = 1174.287908
 VV = 0.000000
 vvv = 0.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 12.408789
 TX = 262.325478
 QCD = 0.000000
 background = 8.960338

2Tau1Mu

scaled to LUMI:

TTTT = 0.115832
 TT = 5.929230
 TTX = 2.675061
 VV = 0.000000
 vvv = 0.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 0.031583
 TX = 0.324465
 QCD = 0.000000
 background = 8.960338

2Tau1L

raw entries:

TTTT = 4954.000000
 TT = 182.000000
 TTX = 2147.000000
 VV = 0.000000
 VVV = 0.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 531.000000
 TX = 503.000000
 QCD = 0.000000
 background = 6.717688

2Tau1L

weighted:

TTTT = 37.739382
 TT = 20298.844339
 TTX = 2240.437308
 VV = 0.000000
 vvv = 0.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 39.567708
 TX = 487.770268
 QCD = 0.000000
 background = 16.520041

2Tau1L

scaled to LUMI:

TTTT = 0.206757
 TT = 10.752811
 TTX = 5.065987
 VV = 0.000000
 vvv = 0.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 0.100708
 TX = 0.600535
 QCD = 0.000000
 background = 16.520041

Event Yield

2Tau2OS

raw entries:

TTTT = 353.000000
 TT = 2.000000
 TTX = 119.000000
 VV = 0.000000
 VVV = 1.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 4.000000
 TX = 36.000000
 QCD = 0.000000
 background = 0.457729

2Tau2OS

weighted:

TTTT = 2.088281
 TT = 142.350423
 TTX = 117.081043
 VV = 0.000000
 vvv = 0.018778
 WJets = 0.000000
 DY = 0.000000
 singleTop = 0.869543
 TX = 36.226800
 QCD = 0.000000
 background = 0.395161

2Tau2OS

scaled to LUMI:

TTTT = 0.011441
 TT = 0.091864
 TTX = 0.259295
 VV = 0.000000
 vvv = 0.002693
 WJets = 0.000000
 DY = 0.000000
 singleTop = 0.002213
 TX = 0.039095
 QCD = 0.000000
 background = 0.395161

2Tau2SS

raw entries:

TTTT = 147.000000
 TT = 0.000000
 TTX = 16.000000
 VV = 0.000000
 VVV = 0.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 3.000000
 TX = 5.000000
 QCD = 0.000000
 background = 0.041054

2Tau2SS

weighted:

TTTT = 1.359831
 TT = 0.000000
 TTX = 16.357750
 VV = 0.000000
 vvv = 0.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 0.158186
 TX = 4.815694
 QCD = 0.000000
 background = 0.033499

2Tau2SS

scaled to LUMI:

TTTT = 0.007450
 TT = 0.000000
 TTX = 0.028013
 VV = 0.000000
 vvv = 0.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 0.000403
 TX = 0.005083
 QCD = 0.000000
 background = 0.033499

2Tau2L

raw entries:

TTTT = 500.000000
 TT = 2.000000
 TTX = 135.000000
 VV = 0.000000
 VVV = 1.000000
 WJets = 0.000000
 DY = 0.000000
 singleTop = 7.000000
 TX = 41.000000
 QCD = 0.000000
 background = 0.498783

2Tau2L

weighted:

TTTT = 3.448112
 TT = 142.350423
 TTX = 133.438793
 VV = 0.000000
 vvv = 0.018778
 WJets = 0.000000
 DY = 0.000000
 singleTop = 1.027728
 TX = 41.042494
 QCD = 0.000000
 background = 0.428660

2Tau2L

scaled to LUMI:

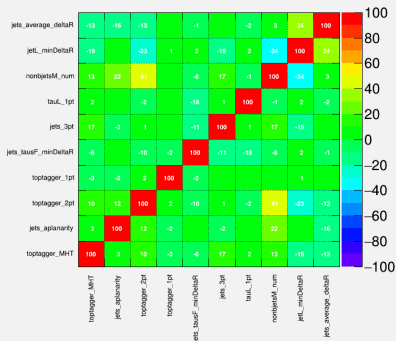
TTTT = 0.018891
 TT = 0.091864
 TTX = 0.287308
 VV = 0.000000
 vvv = 0.002693
 WJets = 0.000000
 DY = 0.000000
 singleTop = 0.002616
 TX = 0.044179
 QCD = 0.000000
 background = 0.428660

Outline

- 1 BDT Overall Strategy
- 2 1Tau1L
- 3 1Tau2OS
- 4 2Tau1L
- 5 Event Yield
- 6 Results of all training**
 - 1tau2os
 - 2tau1l

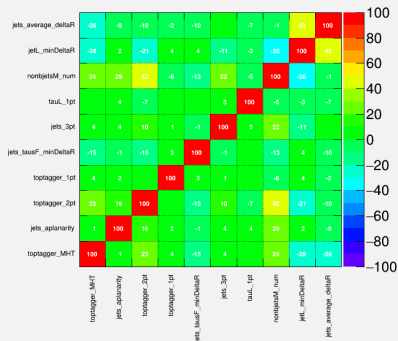
Correlation Matrix (signal)

(10 input variables)

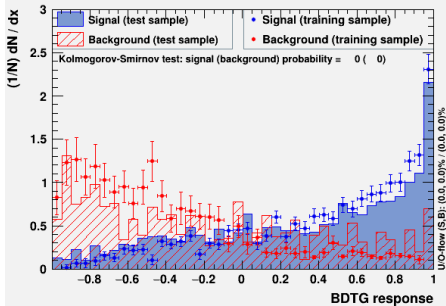


Correlation Matrix (background)

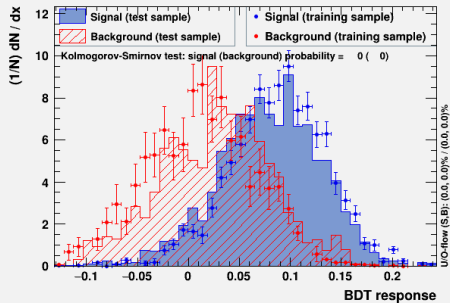
(10 input variables)



TMVA overtraining check for classifier: BDT(10 inputs)

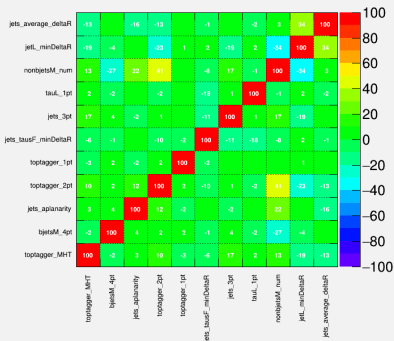


TMVA overtraining check for classifier: BDT(10 inputs)



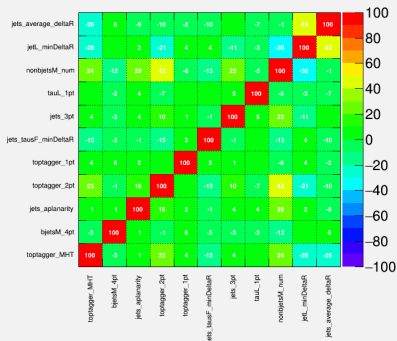
Correlation Matrix (signal)

(11 input variables)

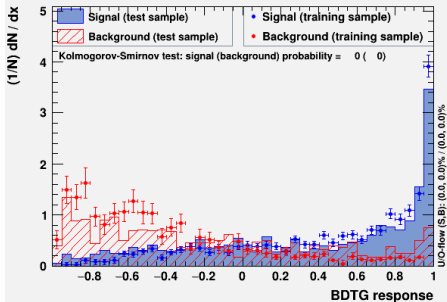


Correlation Matrix (background)

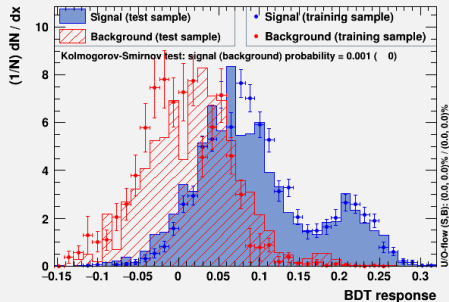
(11 input variables)



TMVA overtraining check for classifier: BDTG(11 inputs)

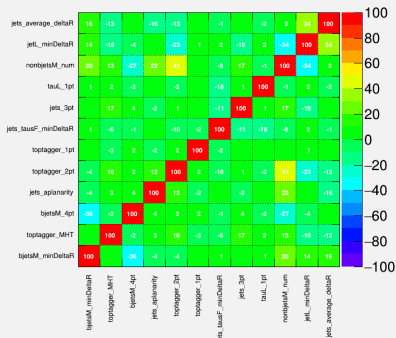


TMVA overtraining check for classifier: BDT(11 inputs)



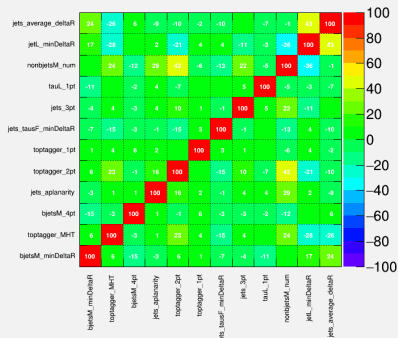
Correlation Matrix (signal)

(12 input variables)

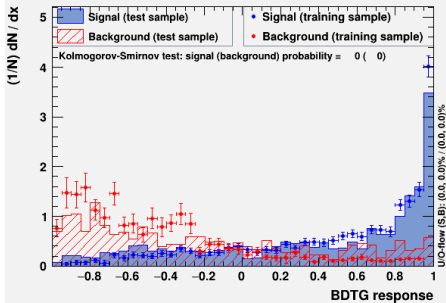


Correlation Matrix (background)

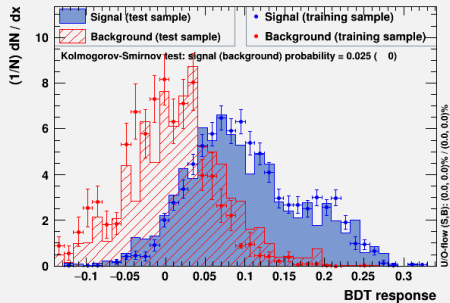
(12 input variables)



TMVA overtraining check for classifier: BDTG(12 inputs)

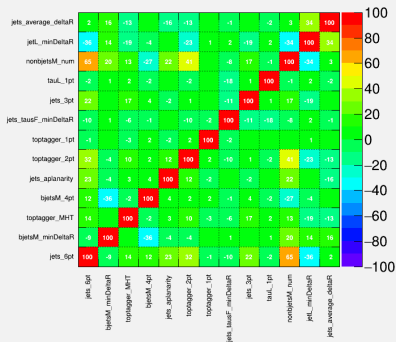


TMVA overtraining check for classifier: BDT(12 inputs)



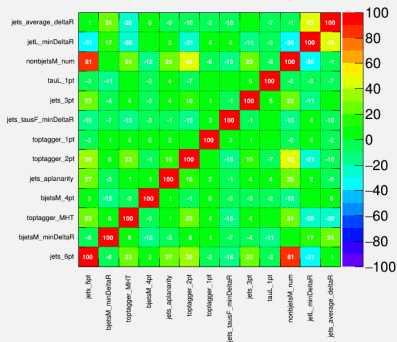
Correlation Matrix (signal)

(13 input variables)

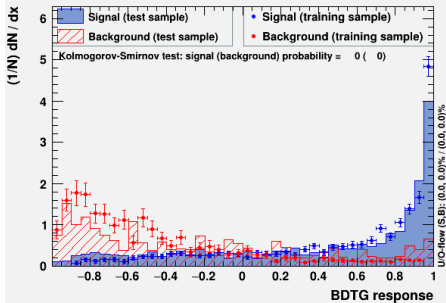


Correlation Matrix (background)

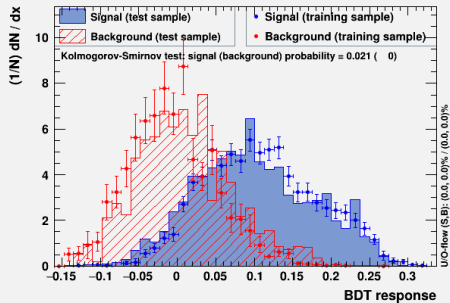
(13 input variables)



TMVA overtraining check for classifier: BDTG(13 inputs)

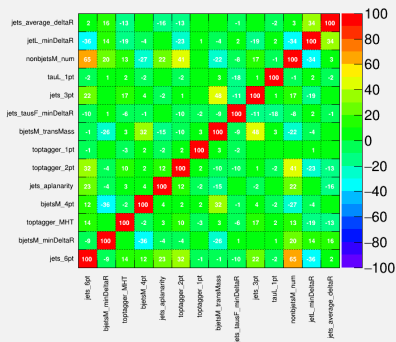


TMVA overtraining check for classifier: BDT(13 inputs)



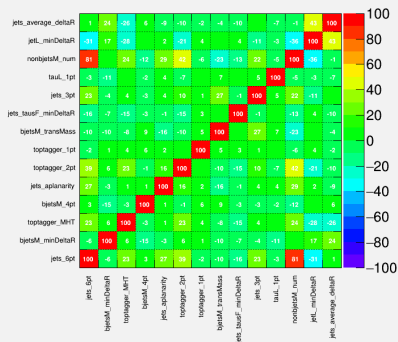
Correlation Matrix (signal)

(14 input variables)

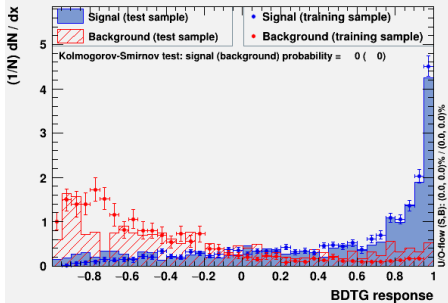


Correlation Matrix (background)

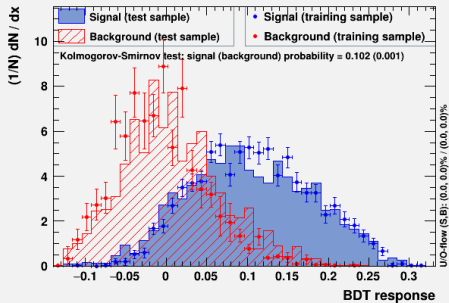
(14 input variables)



TMVA overtraining check for classifier: BDTG(14 inputs)

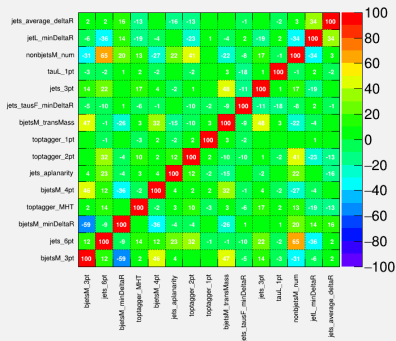


TMVA overtraining check for classifier: BDT(14 inputs)



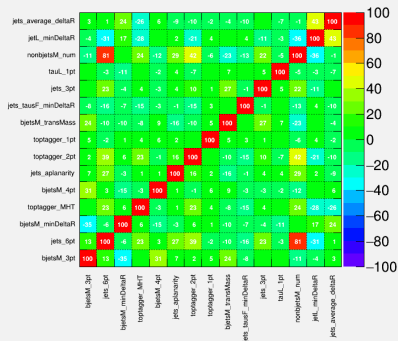
Correlation Matrix (signal)

(15 input variables)

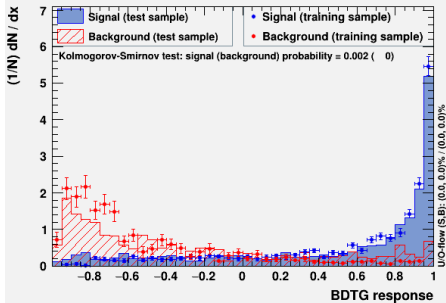


Correlation Matrix (background)

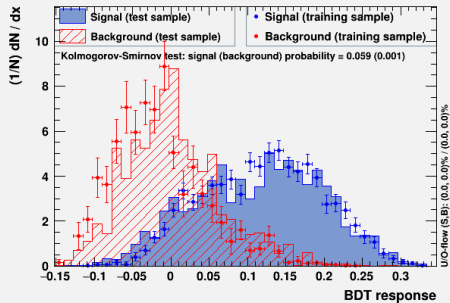
(15 input variables)



TMVA overtraining check for classifier: BDTG(15 inputs)

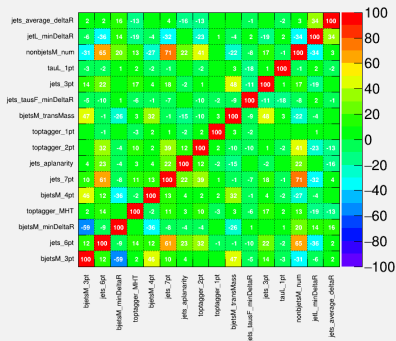


TMVA overtraining check for classifier: BDT(15 inputs)



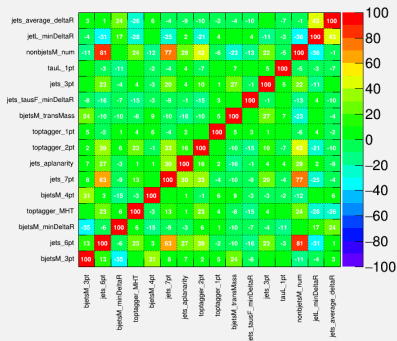
Correlation Matrix (signal)

(16 input variables)

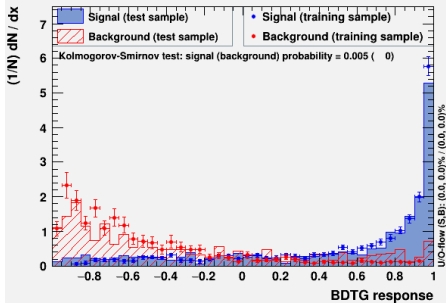


Correlation Matrix (background)

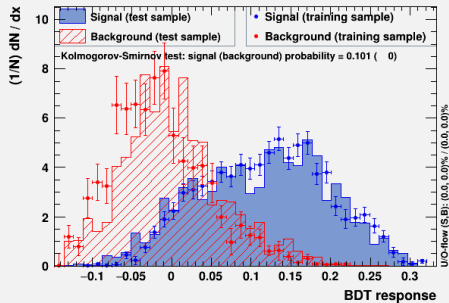
(16 input variables)



TMVA overtraining check for classifier: BDTG(16 inputs)

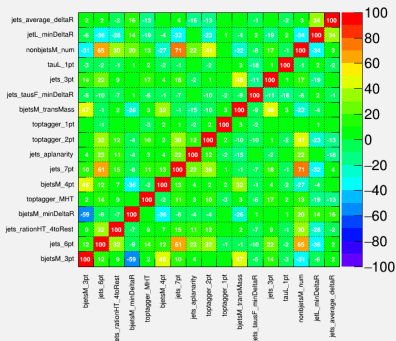


TMVA overtraining check for classifier: BDT(16 inputs)



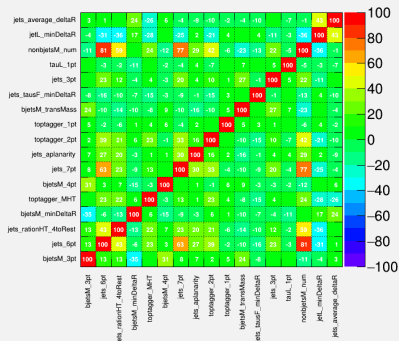
Correlation Matrix (signal)

(17 input variables)

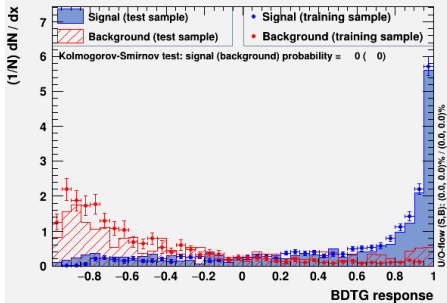


Correlation Matrix (background)

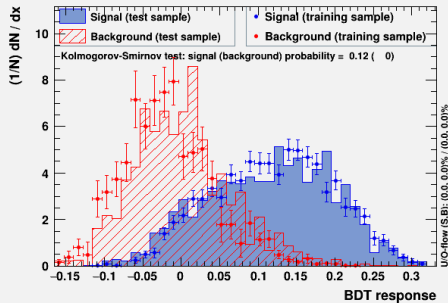
(17 input variables)



TMVA overtraining check for classifier: BDTG(17 inputs)

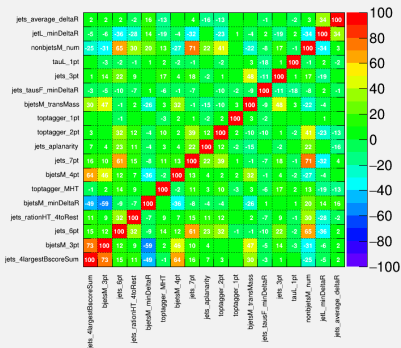


TMVA overtraining check for classifier: BDT(17 inputs)



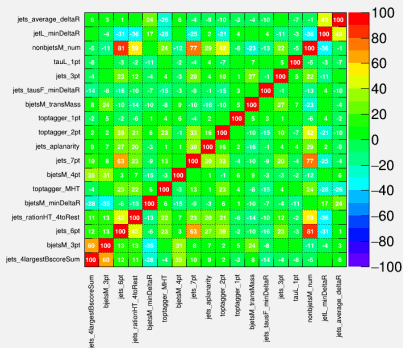
Correlation Matrix (signal)

(18 input variables)

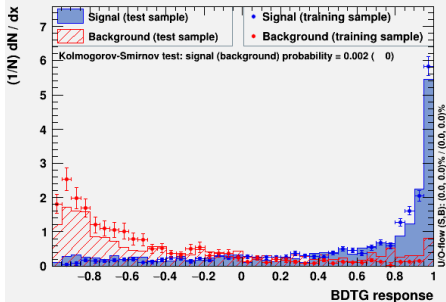


Correlation Matrix (background)

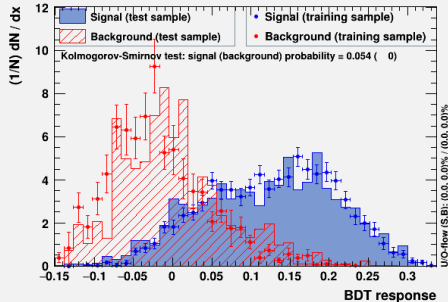
(18 input variables)



TMVA overtraining check for classifier: BDTG(18 inputs)

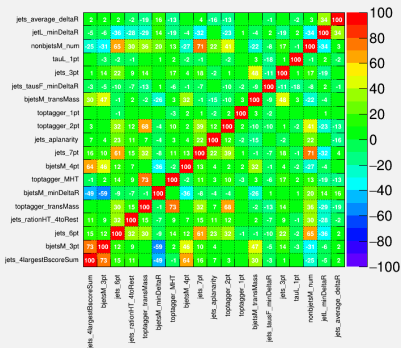


TMVA overtraining check for classifier: BDT(18 inputs)



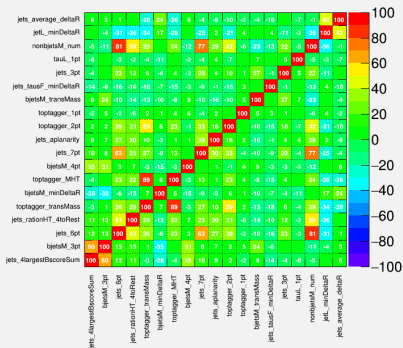
Correlation Matrix (signal)

(19 input variables)

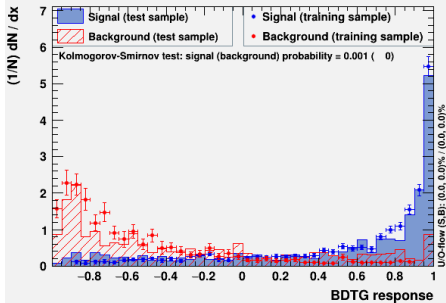


Correlation Matrix (background)

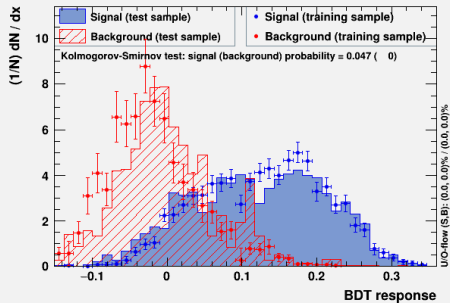
(19 input variables)



TMVA overtraining check for classifier: BDTG(19 inputs)

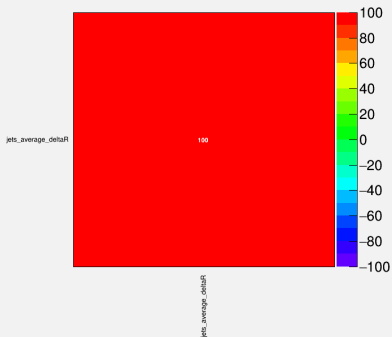


TMVA overtraining check for classifier: BDT(19 inputs)



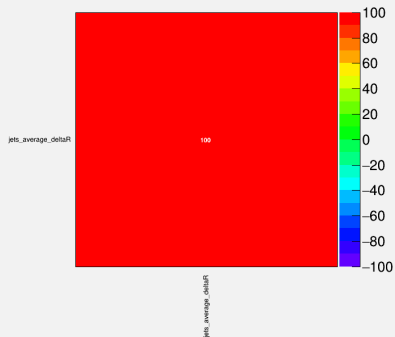
Correlation Matrix (signal)

(1 input variables)

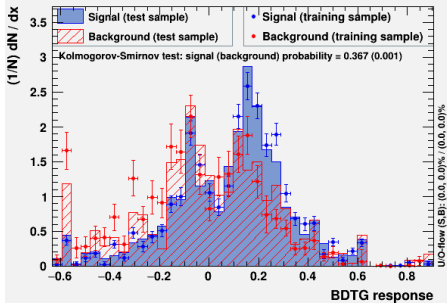


Correlation Matrix (background)

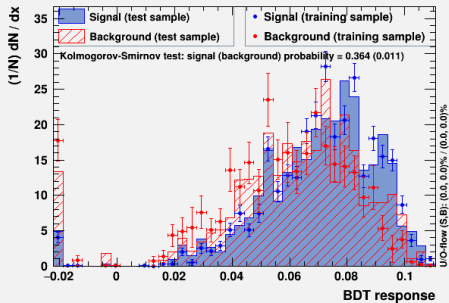
(1 input variables)



TMVA overtraining check for classifier: BDTG(1 inputs)

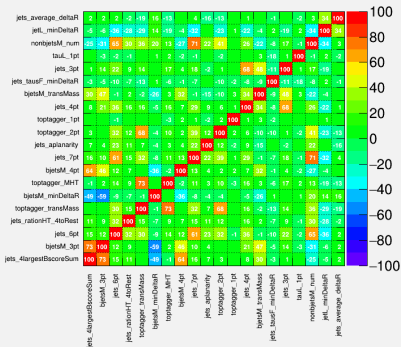


TMVA overtraining check for classifier: BDT(1 inputs)



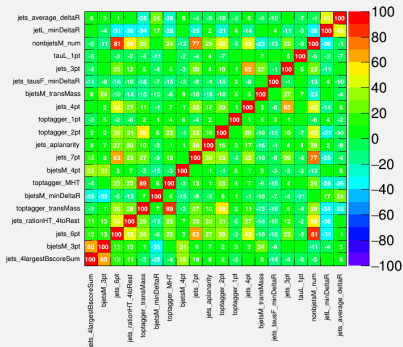
Correlation Matrix (signal)

(20 input variables)

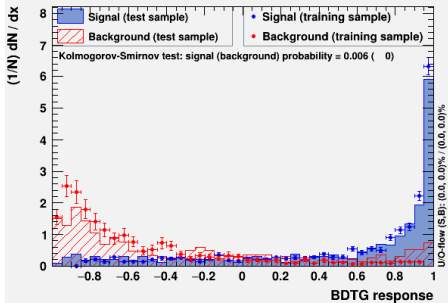


Correlation Matrix (background)

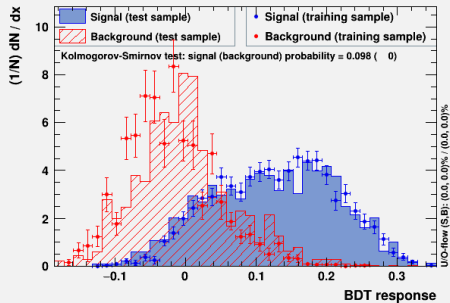
(20 input variables)



TMVA overtraining check for classifier: BDTG(20 inputs)

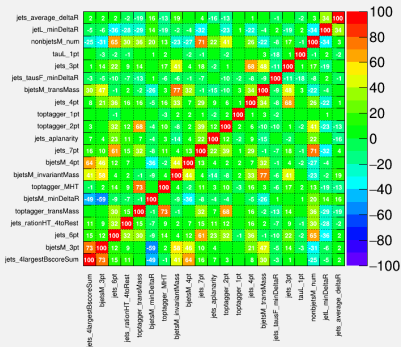


TMVA overtraining check for classifier: BDT(20 inputs)



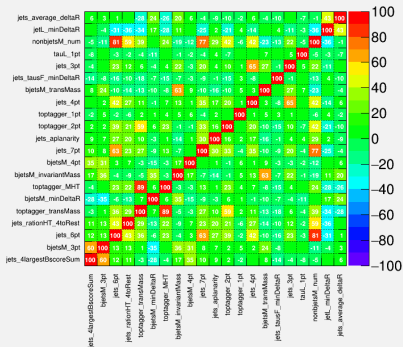
Correlation Matrix (signal)

(21 input variables)

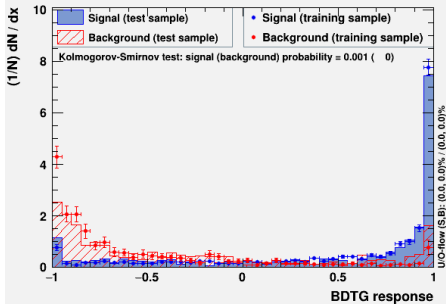


Correlation Matrix (background)

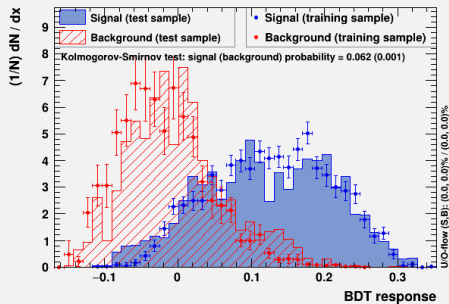
(21 input variables)



TMVA overtraining check for classifier: BDTG(21 inputs)

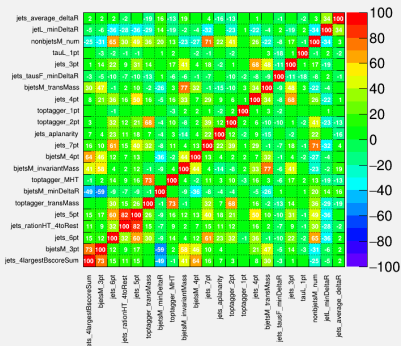


TMVA overtraining check for classifier: BDT(21 inputs)



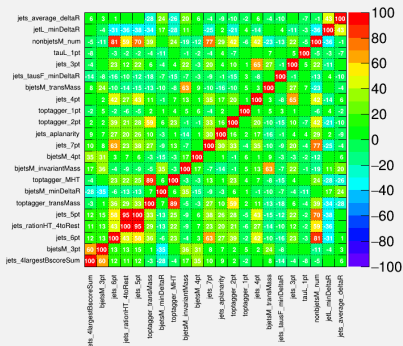
Correlation Matrix (signal)

(22 input variables)

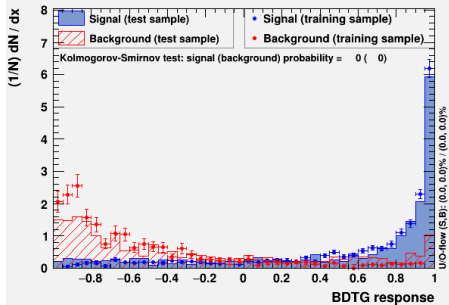


Correlation Matrix (background)

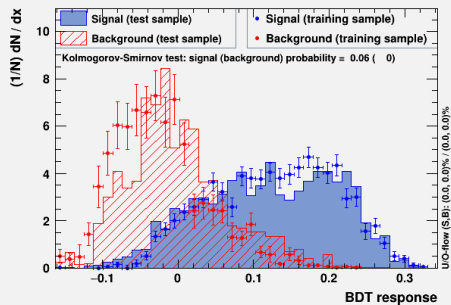
(22 input variables)



TMVA overtraining check for classifier: BDTG(22 inputs)

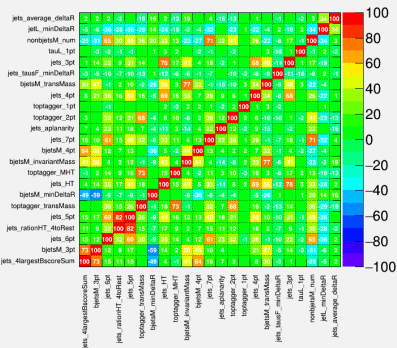


TMVA overtraining check for classifier: BDT(22 inputs)



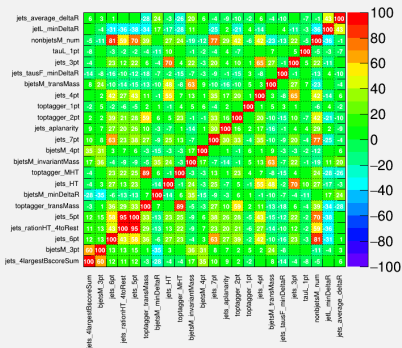
Correlation Matrix (signal)

(23 input variables)

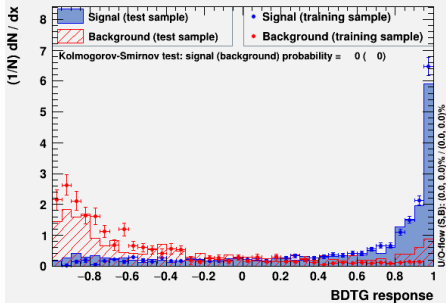


Correlation Matrix (background)

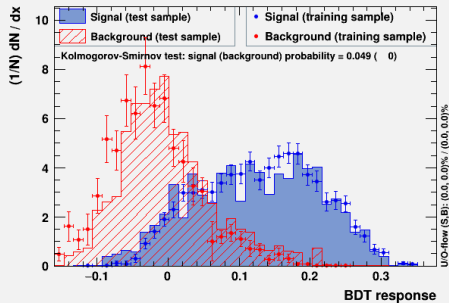
(23 input variables)



TMVA overtraining check for classifier: BDTG(23 inputs)

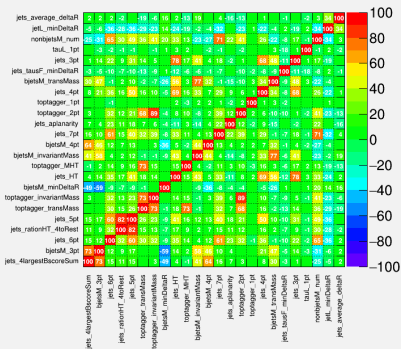


TMVA overtraining check for classifier: BDT(23 inputs)



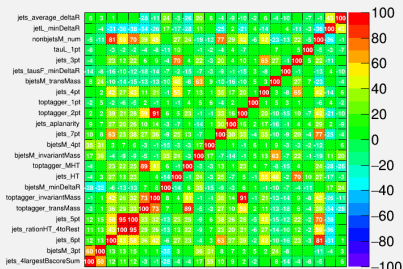
Correlation Matrix (signal)

(24 input variables)

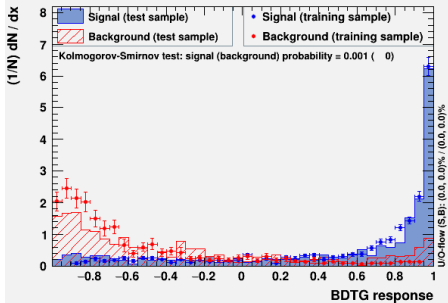


Correlation Matrix (background)

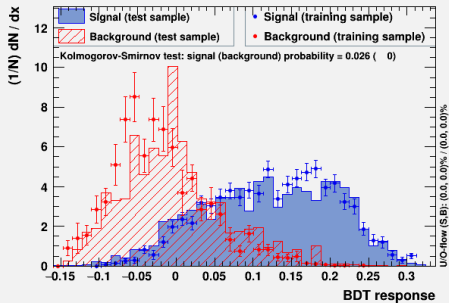
(24 input variables)



TMVA overtraining check for classifier: BDTG(24 inputs)

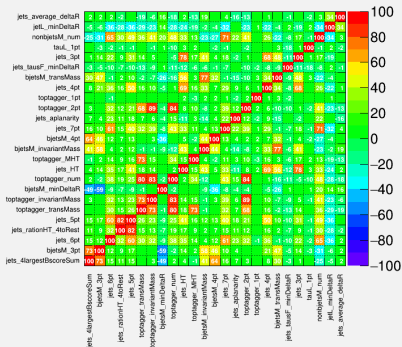


TMVA overtraining check for classifier: BDT(24 inputs)



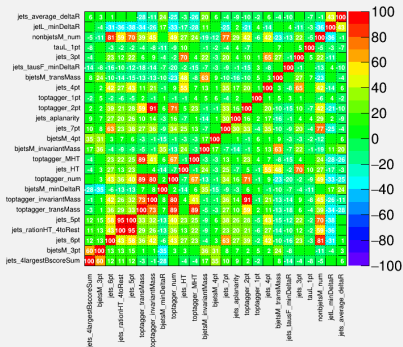
Correlation Matrix (signal)

(25 input variables)

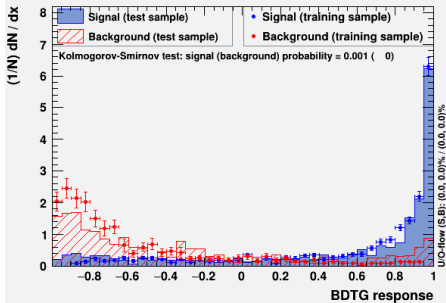


Correlation Matrix (background)

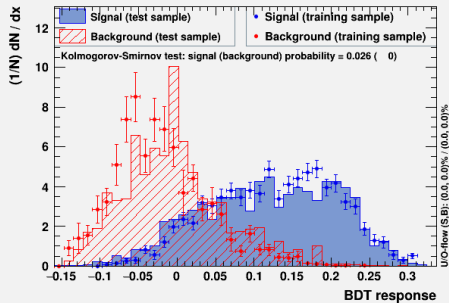
(25 input variables)



TMVA overtraining check for classifier: BDTG(25 inputs)

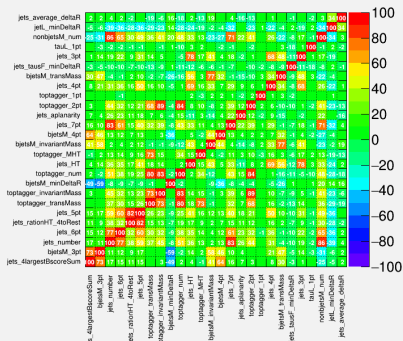


TMVA overtraining check for classifier: BDT(25 inputs)



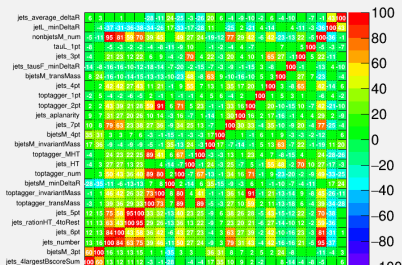
Correlation Matrix (signal)

(26 input variables)

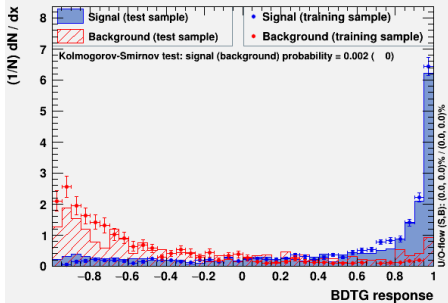


Correlation Matrix (background)

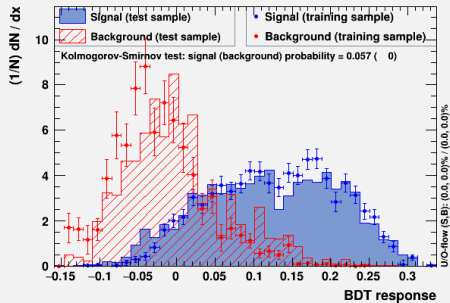
(26 input variables)



TMVA overtraining check for classifier: BDTG(26 inputs)

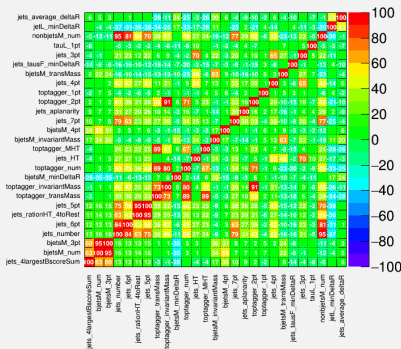


TMVA overtraining check for classifier: BDT(26 inputs)

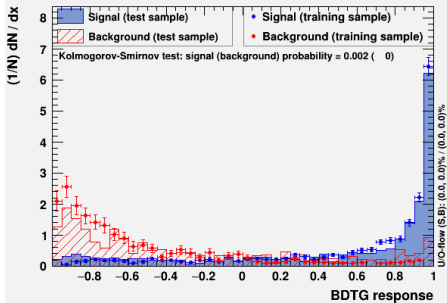


Correlation Matrix (background)

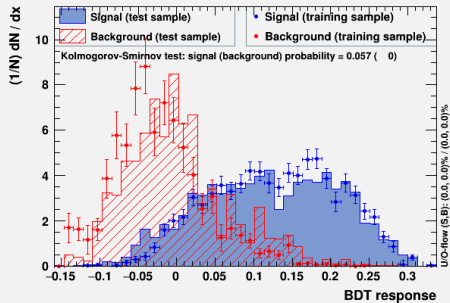
(27 input variables)



TMVA overtraining check for classifier: BDTG(27 inputs)

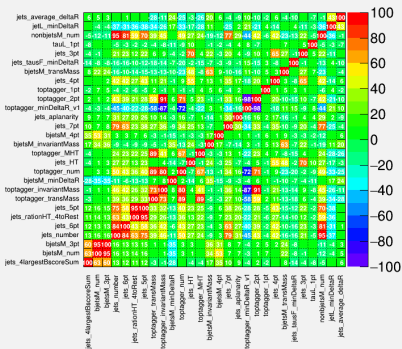


TMVA overtraining check for classifier: BDT(27 inputs)

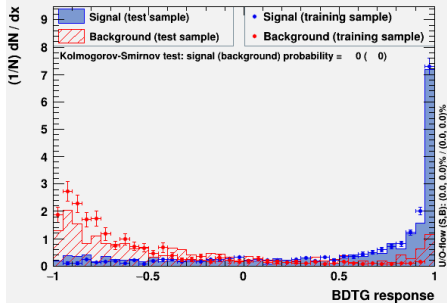


Correlation Matrix (background)

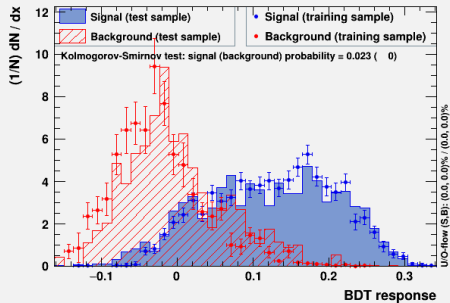
(28 input variables)



TMVA overtraining check for classifier: BDTG(28 inputs)

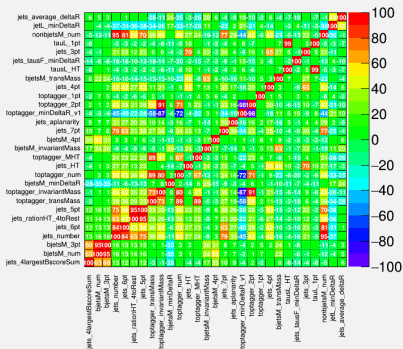


TMVA overtraining check for classifier: BDT(28 inputs)

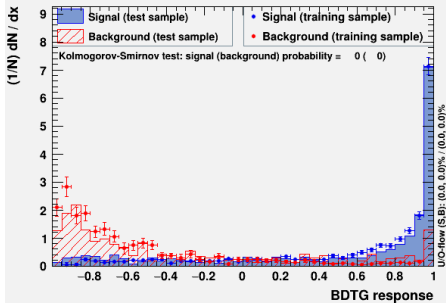


Correlation Matrix (background)

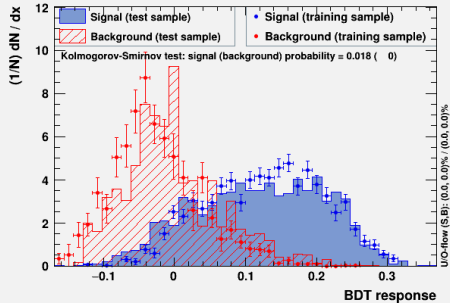
(29 input variables)



TMVA overtraining check for classifier: BDTG(29 inputs)

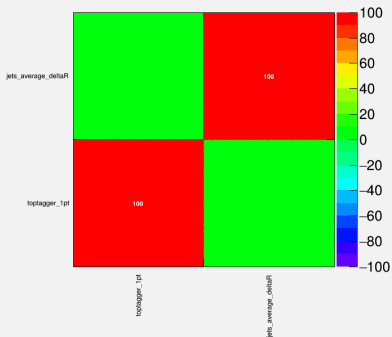


TMVA overtraining check for classifier: BDT(29 inputs)



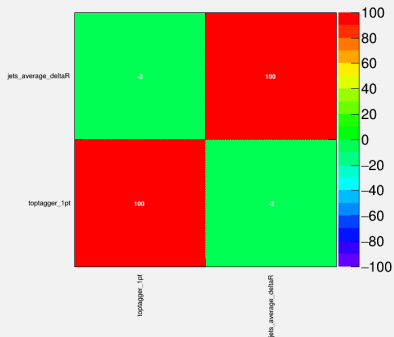
Correlation Matrix (signal)

(2 input variables)

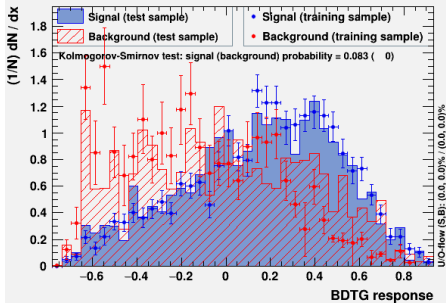


Correlation Matrix (background)

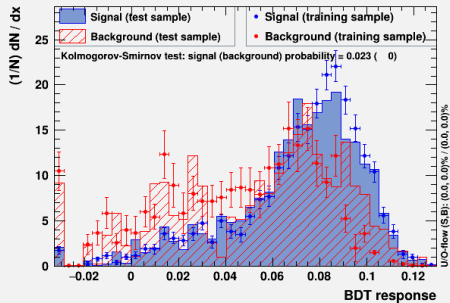
(2 input variables)



TMVA overtraining check for classifier: BDT(2 inputs)

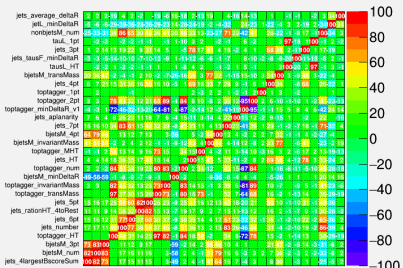


TMVA overtraining check for classifier: BDT(2 inputs)



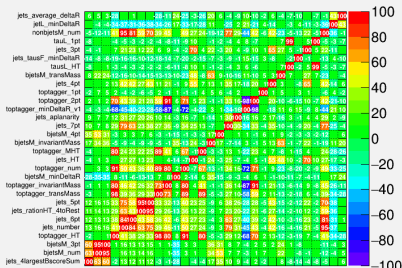
Correlation Matrix (signal)

(30 input variables)

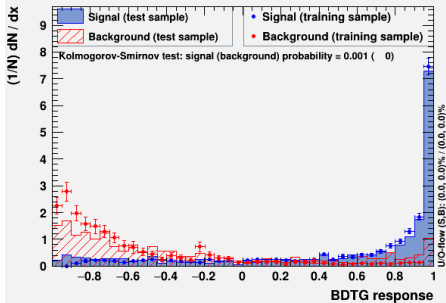


Correlation Matrix (background)

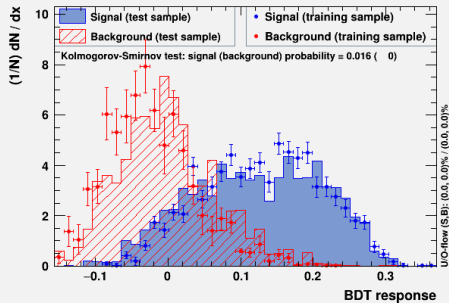
(30 input variables)



TMVA overtraining check for classifier: BDTG(30 inputs)

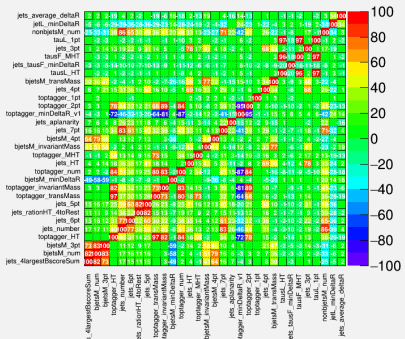


TMVA overtraining check for classifier: BDT(30 inputs)



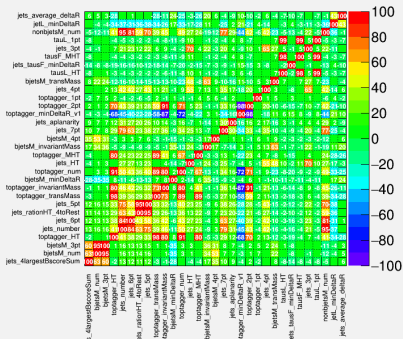
Correlation Matrix (signal)

(31 input variables)

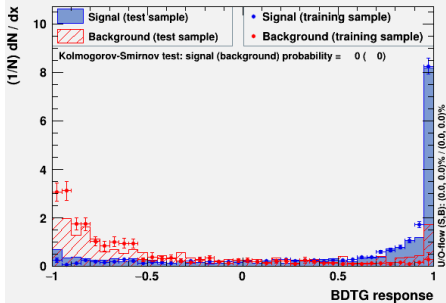


Correlation Matrix (background)

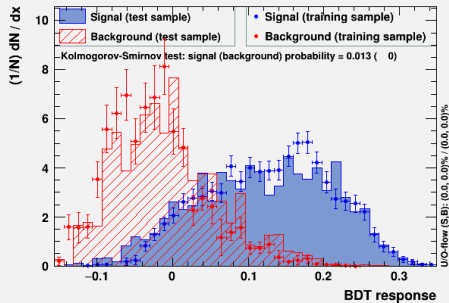
(31 input variables)



TMVA overtraining check for classifier: BDTG(31 inputs)

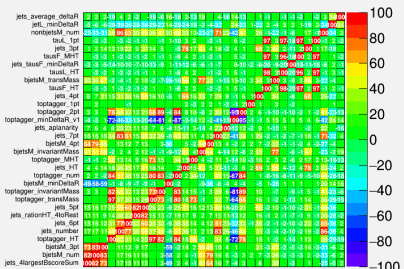


TMVA overtraining check for classifier: BDT(31 inputs)



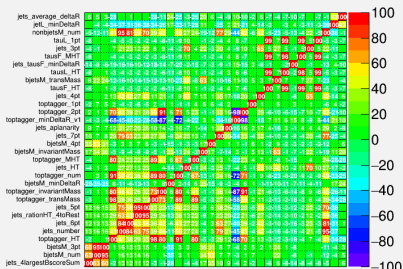
Correlation Matrix (signal)

(32 input variables)

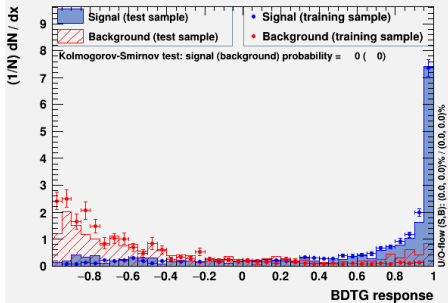


Correlation Matrix (background)

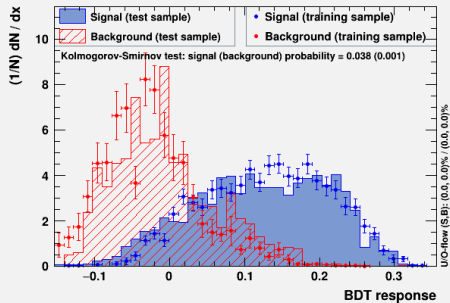
(32 input variables)



TMVA overtraining check for classifier: BDTG(32 inputs)

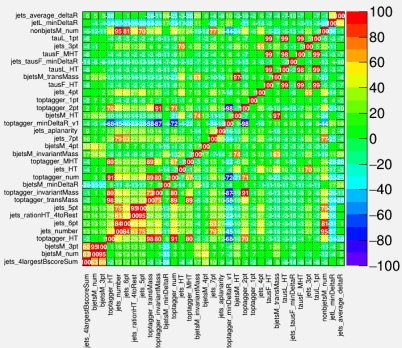


TMVA overtraining check for classifier: BDT(32 inputs)

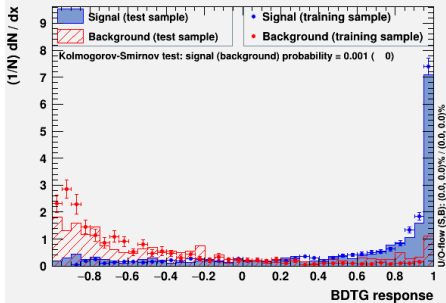


Correlation Matrix (background)

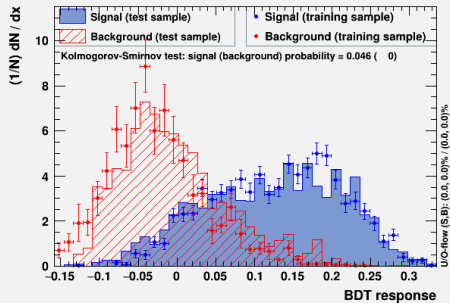
(33 input variables)



TMVA overtraining check for classifier: BDTG(33 inputs)

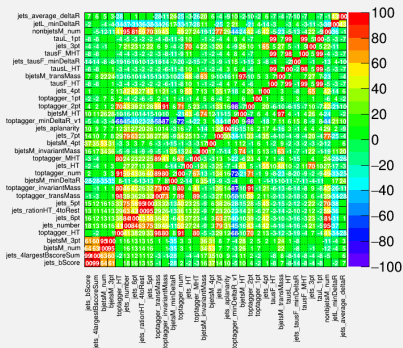


TMVA overtraining check for classifier: BDT(33 inputs)

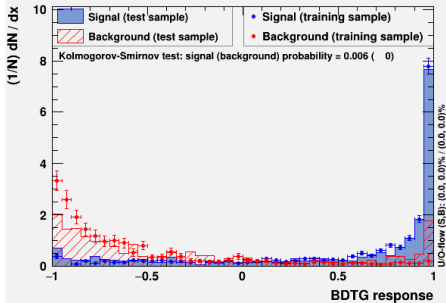


Correlation Matrix (background)

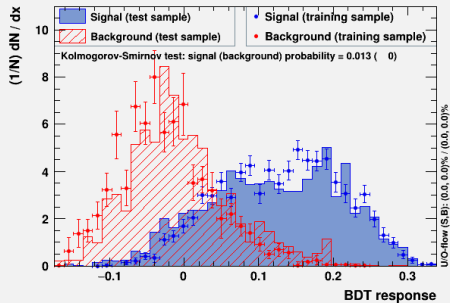
(34 input variables)



TMVA overtraining check for classifier: BDTG(34 inputs)

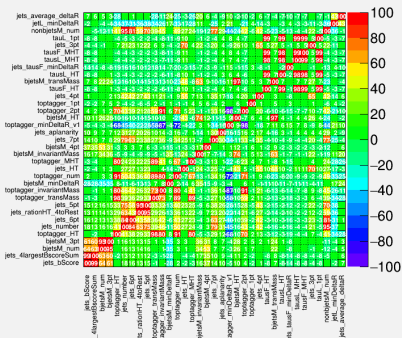


TMVA overtraining check for classifier: BDT(34 inputs)

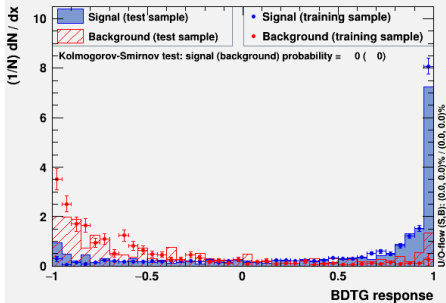


Correlation Matrix (background)

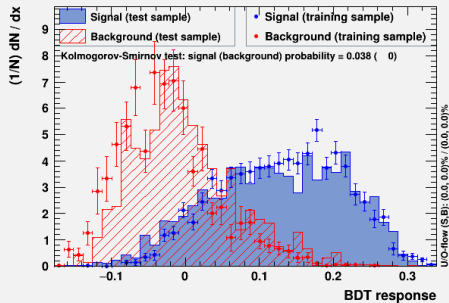
(35 input variables)



TMVA overtraining check for classifier: BDTG(35 inputs)

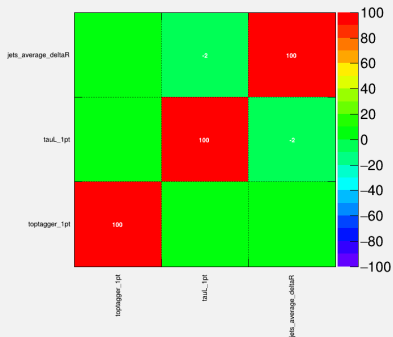


TMVA overtraining check for classifier: BDT(35 inputs)



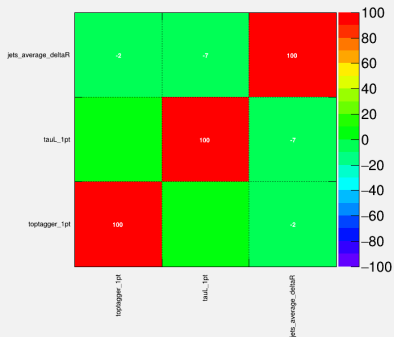
Correlation Matrix (signal)

(3 input variables)

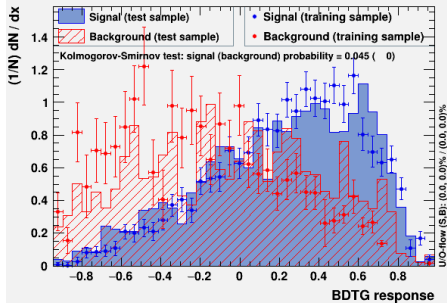


Correlation Matrix (background)

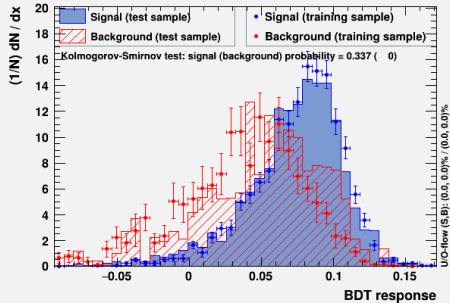
(3 input variables)



TMVA overtraining check for classifier: BDT(3 inputs)

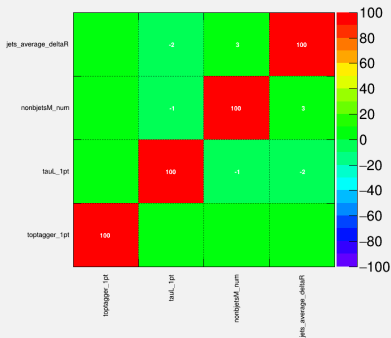


TMVA overtraining check for classifier: BDT(3 inputs)



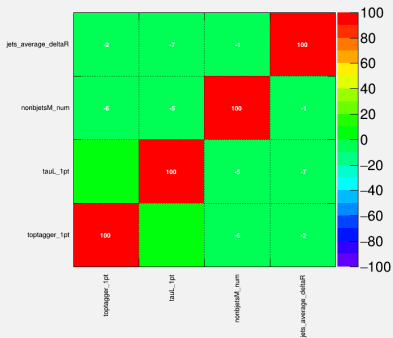
Correlation Matrix (signal)

(4 input variables)

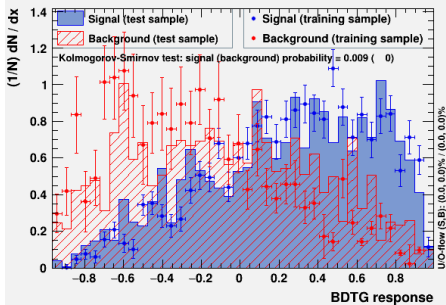


Correlation Matrix (background)

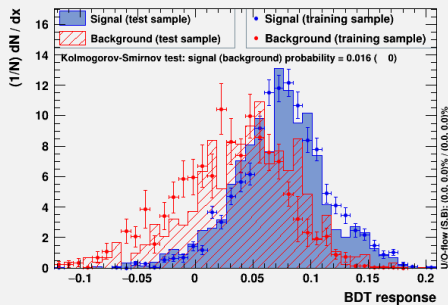
(4 input variables)



TMVA overtraining check for classifier: BDT(4 inputs)

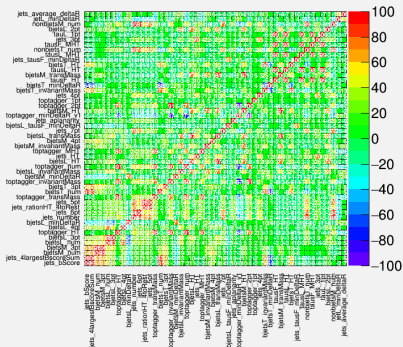


TMVA overtraining check for classifier: BDT(4 inputs)

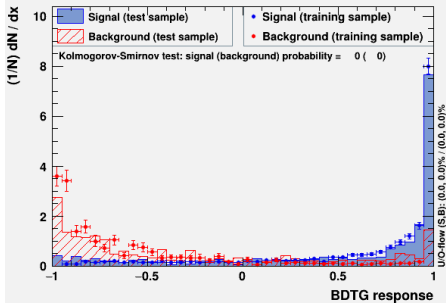


Correlation Matrix (background)

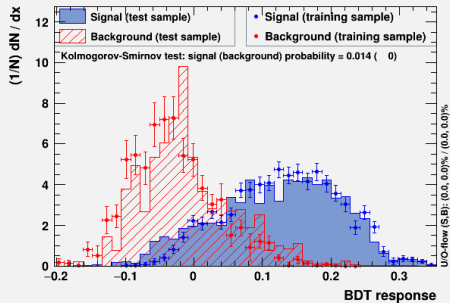
(50 input variables)



TMVA overtraining check for classifier: BDTG(50 inputs)

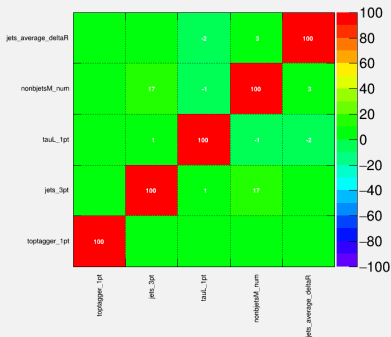


TMVA overtraining check for classifier: BDT(50 inputs)



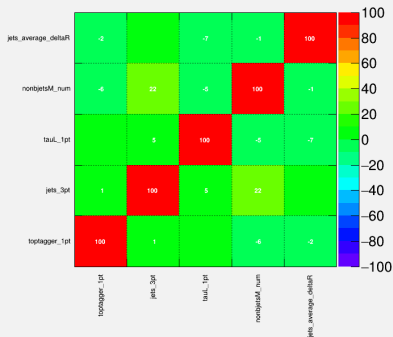
Correlation Matrix (signal)

(5 input variables)

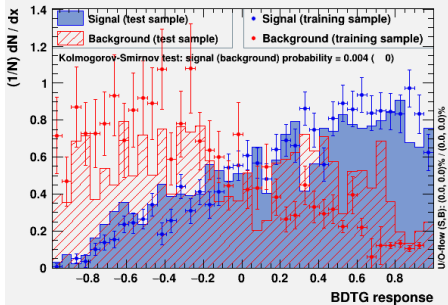


Correlation Matrix (background)

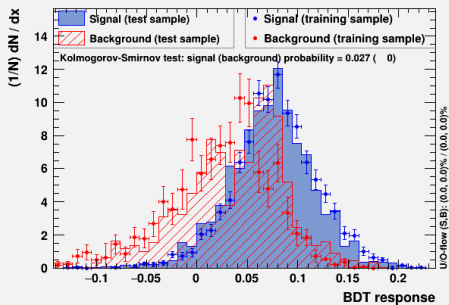
(5 input variables)



TMVA overtraining check for classifier: BDT(5 inputs)

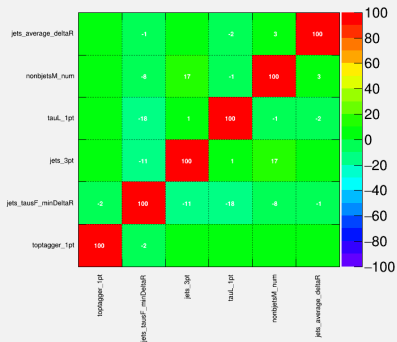


TMVA overtraining check for classifier: BDT(5 inputs)



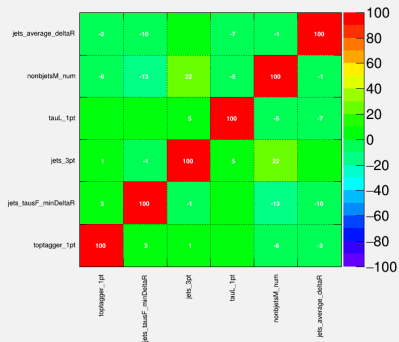
Correlation Matrix (signal)

(6 input variables)

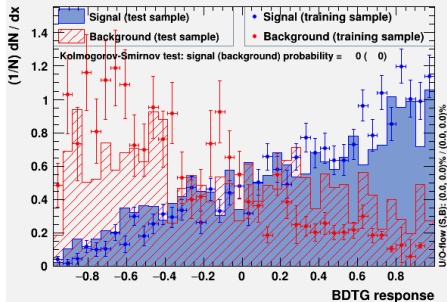


Correlation Matrix (background)

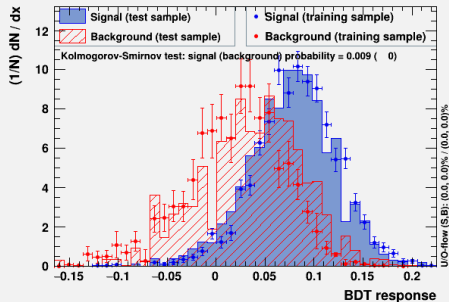
(6 input variables)



TMVA overtraining check for classifier: BDTG(6 inputs)

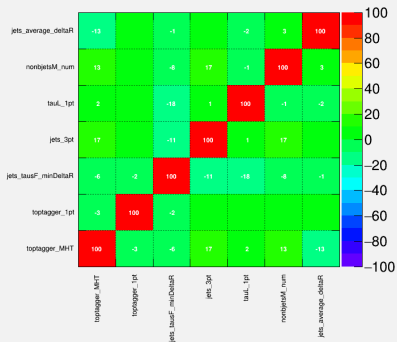


TMVA overtraining check for classifier: BDT(6 inputs)



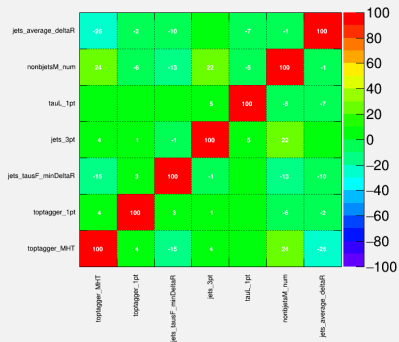
Correlation Matrix (signal)

(7 input variables)

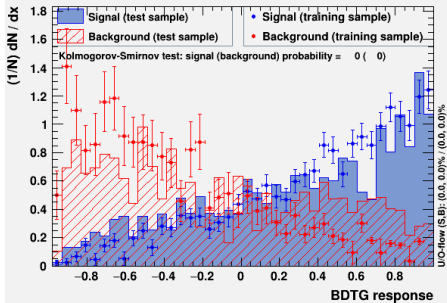


Correlation Matrix (background)

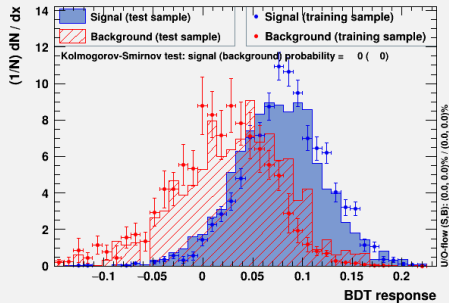
(7 input variables)



TMVA overtraining check for classifier: BDT(7 inputs)

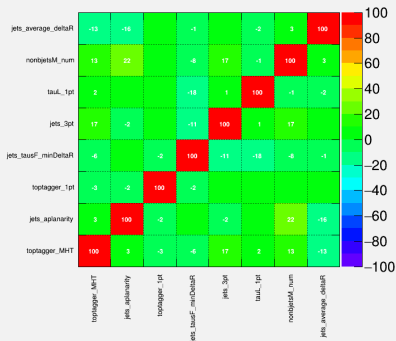


TMVA overtraining check for classifier: BDT(7 inputs)



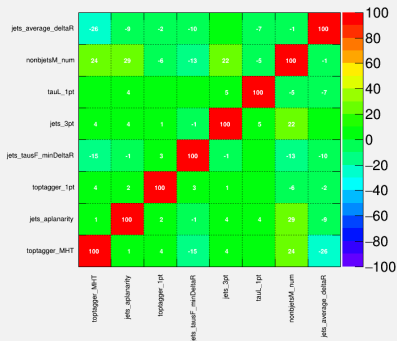
Correlation Matrix (signal)

(8 input variables)

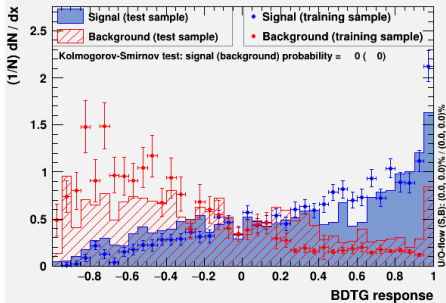


Correlation Matrix (background)

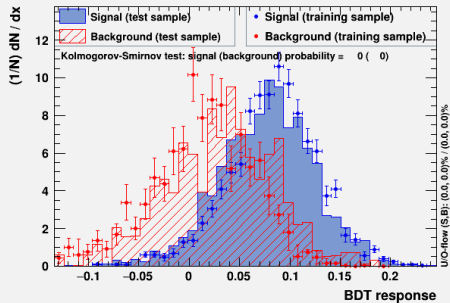
(8 input variables)



TMVA overtraining check for classifier: BDTG(8 inputs)

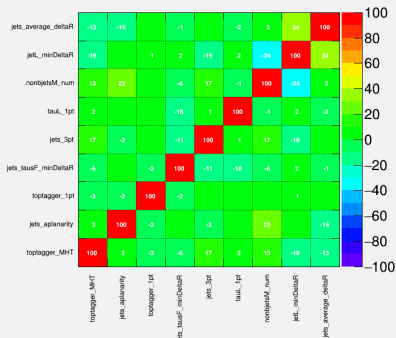


TMVA overtraining check for classifier: BDT(8 inputs)



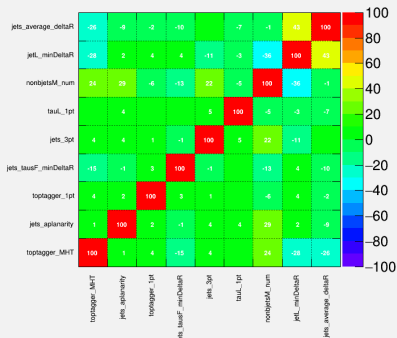
Correlation Matrix (signal)

(9 input variables)

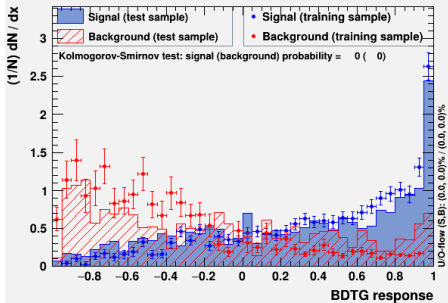


Correlation Matrix (background)

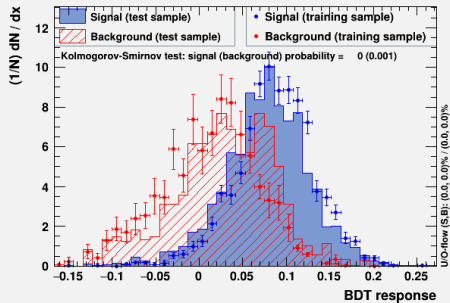
(9 input variables)



TMVA overtraining check for classifier: BDT(9 inputs)

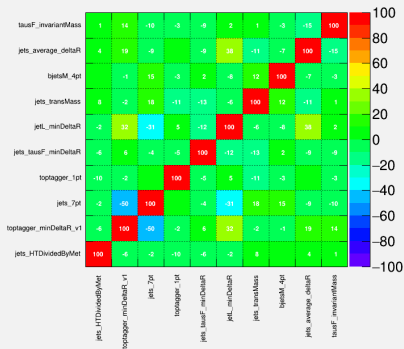


TMVA overtraining check for classifier: BDT(9 inputs)



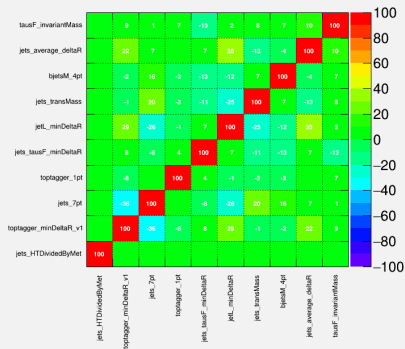
Correlation Matrix (background)

(10 input variables)

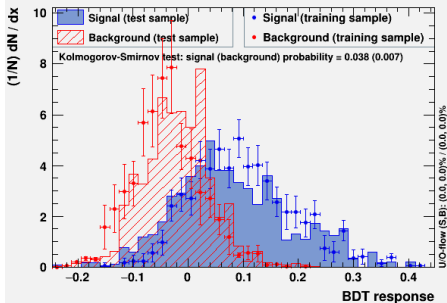


Correlation Matrix (signal)

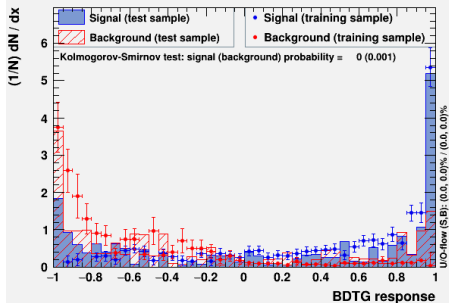
(10 input variables)



TMVA overtraining check for classifier: BDT(10 inputs)

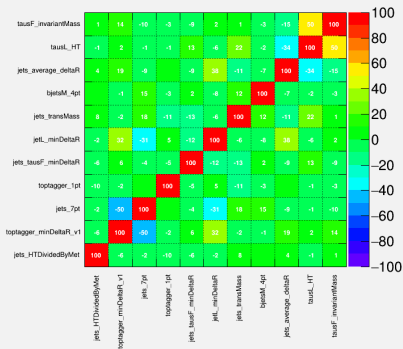


TMVA overtraining check for classifier: BDTG(10 inputs)



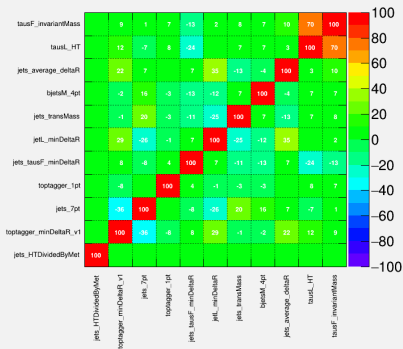
Correlation Matrix (background)

(11 input variables)

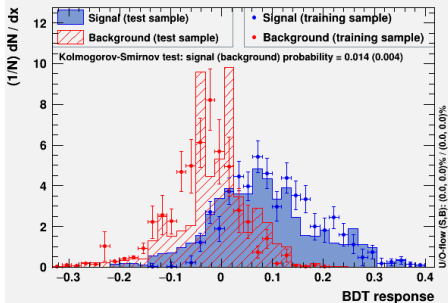


Correlation Matrix (signal)

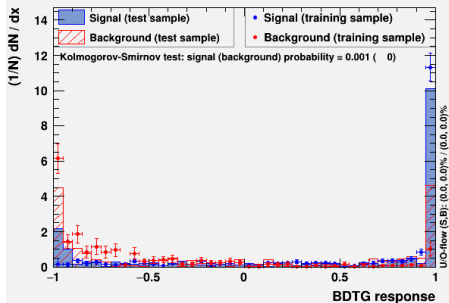
(11 input variables)



TMVA overtraining check for classifier: BDT(11 inputs)

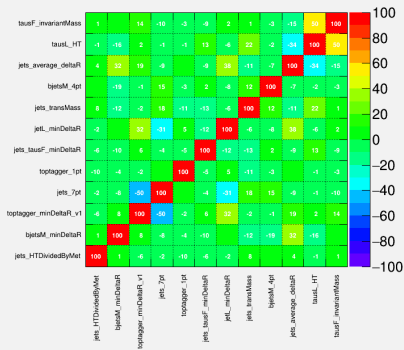


TMVA overtraining check for classifier: BDTG(11 inputs)



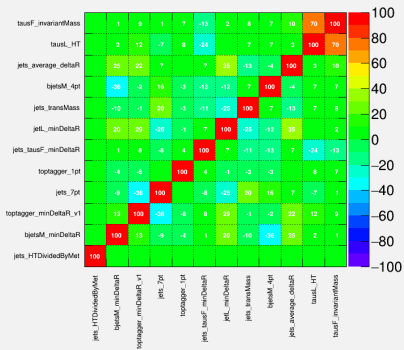
Correlation Matrix (background)

(12 input variables)

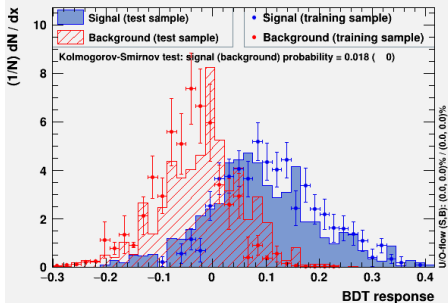


Correlation Matrix (signal)

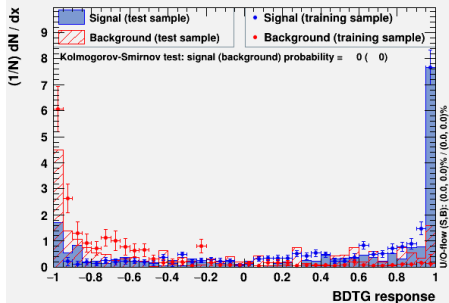
(12 input variables)



TMVA overtraining check for classifier: BDT(12 inputs)

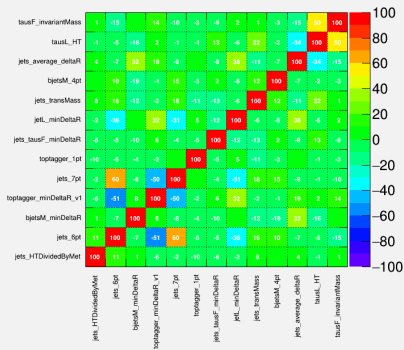


TMVA overtraining check for classifier: BDTG(12 inputs)



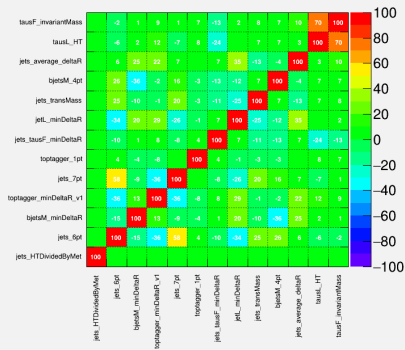
Correlation Matrix (background)

(13 input variables)

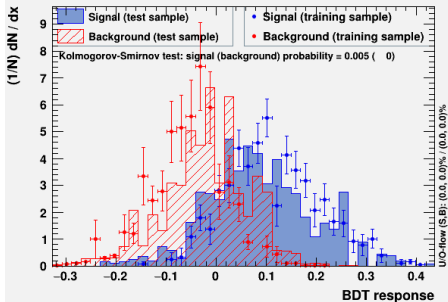


Correlation Matrix (signal)

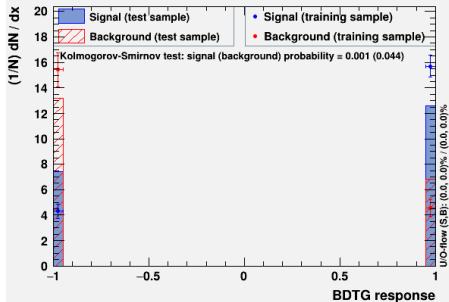
(13 input variables)



TMVA overtraining check for classifier: BDT(13 inputs)

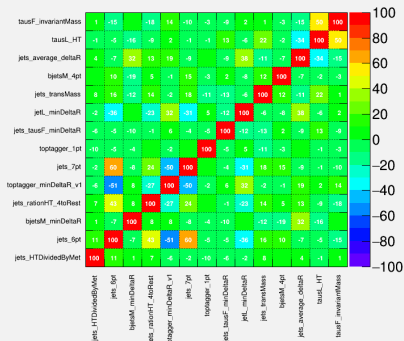


TMVA overtraining check for classifier: BDTG(13 inputs)



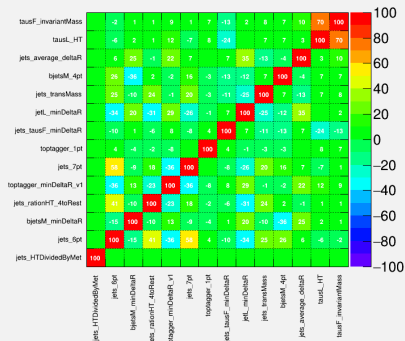
Correlation Matrix (background)

(14 input variables)

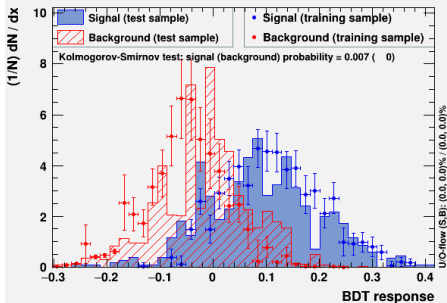


Correlation Matrix (signal)

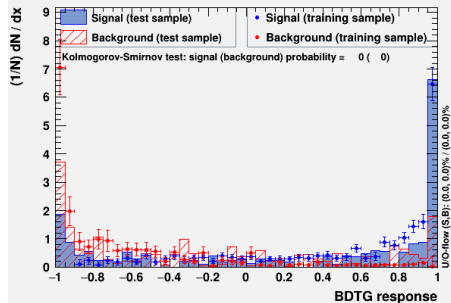
(14 input variables)



TMVA overtraining check for classifier: BDT(14 inputs)

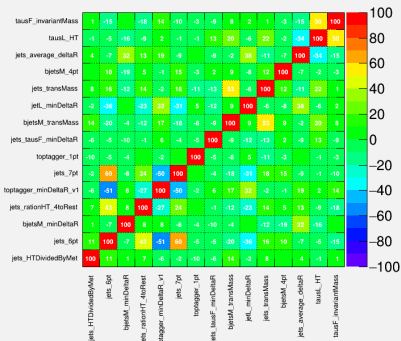


TMVA overtraining check for classifier: BDTG(14 inputs)



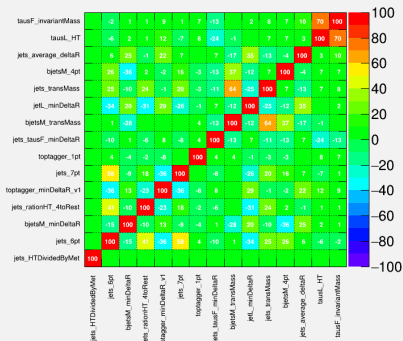
Correlation Matrix (background)

(15 input variables)

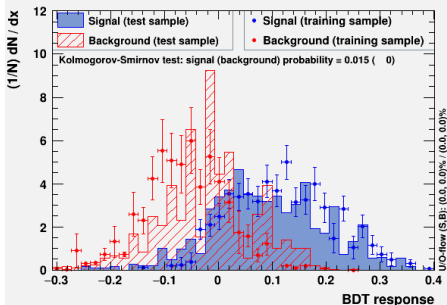


Correlation Matrix (signal)

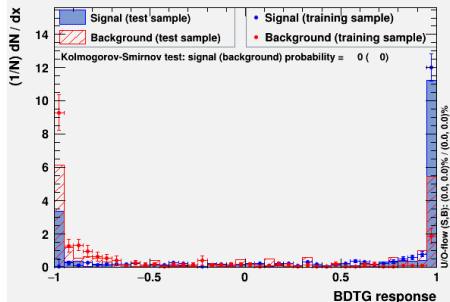
(15 input variables)



TMVA overtraining check for classifier: BDT(15 inputs)

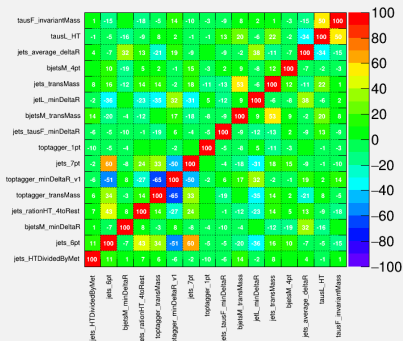


TMVA overtraining check for classifier: BDTG(15 inputs)



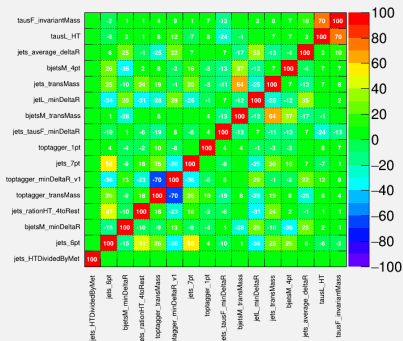
Correlation Matrix (background)

(16 input variables)

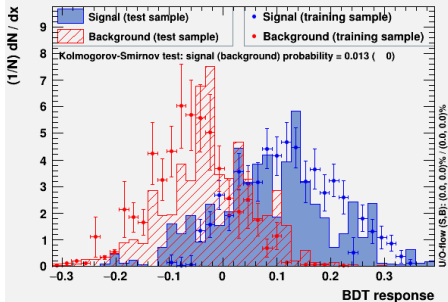


Correlation Matrix (signal)

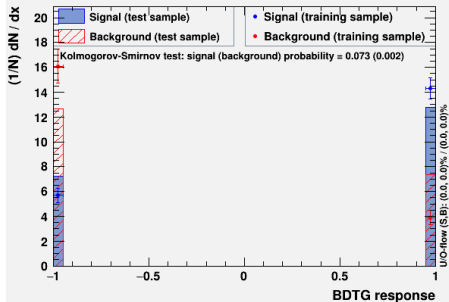
(16 input variables)



TMVA overtraining check for classifier: BDT(16 inputs)

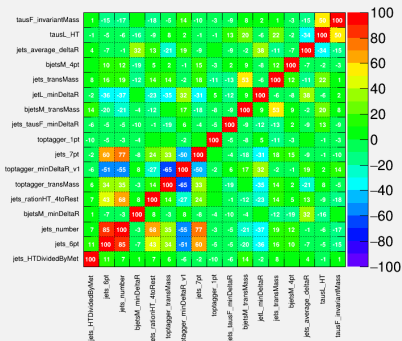


TMVA overtraining check for classifier: BDTG(16 inputs)



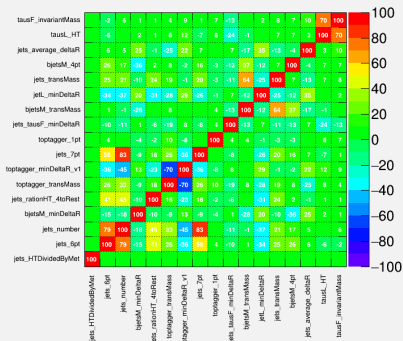
Correlation Matrix (background)

(17 input variables)

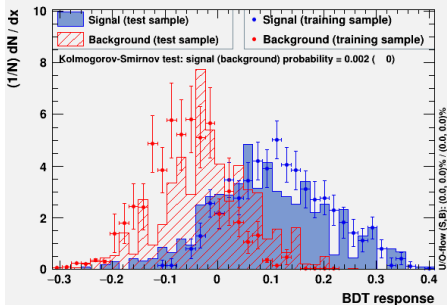


Correlation Matrix (signal)

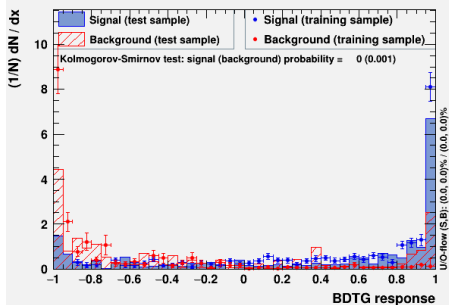
(17 input variables)



TMVA overtraining check for classifier: BDT(17 inputs)

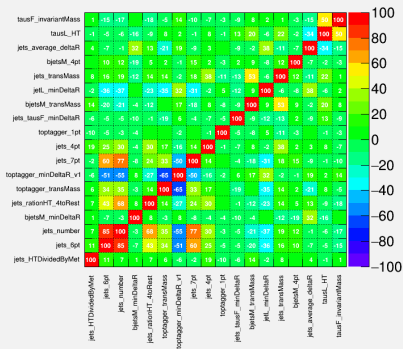


TMVA overtraining check for classifier: BDTG(17 inputs)



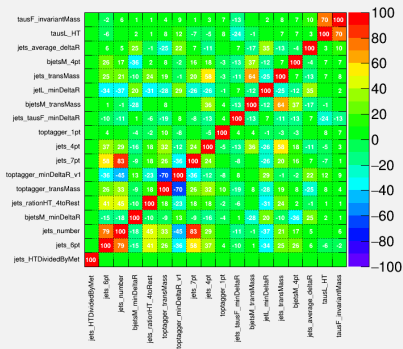
Correlation Matrix (background)

(18 input variables)

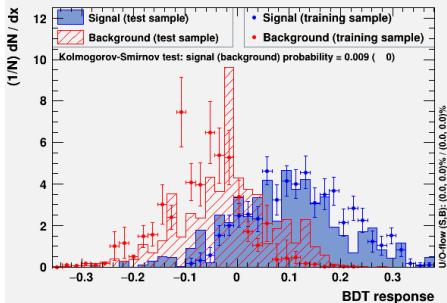


Correlation Matrix (signal)

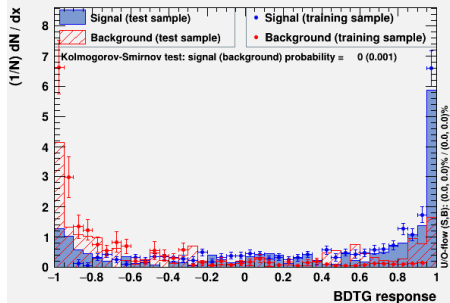
(18 input variables)



TMVA overtraining check for classifier: BDT(18 inputs)

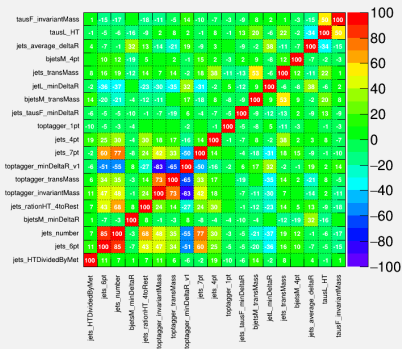


TMVA overtraining check for classifier: BDTG(18 inputs)



Correlation Matrix (background)

(19 input variables)



Correlation Matrix (signal)

(19 input variables)

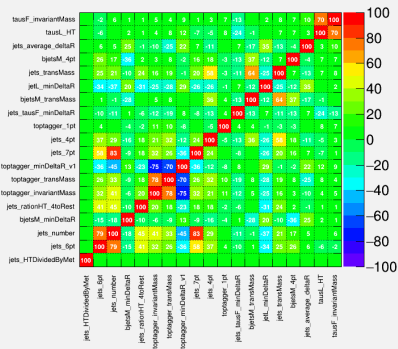
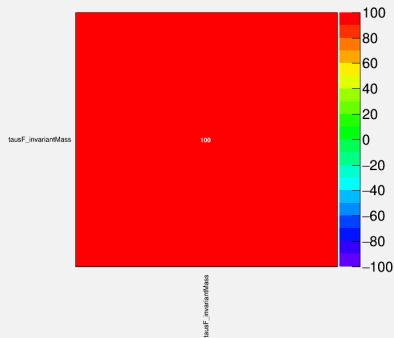


Figure 1 is a plot showing the probability density function (PDF) of the BDTG response for signal and background samples. The x-axis is labeled "BDTG response" and ranges from -1 to 1. The y-axis is labeled $(1/N) dN/dx$ and ranges from 0 to 12. The plot displays two distributions: Signal (test sample) in blue and Background (test sample) in red. Both distributions are highly peaked at the extremes of -1 and 1. The Kolmogorov-Smirnov test result is shown as "signal (background) probability = 0 (0)". The U/O-flow (S,B) is given as (0.0, 0.0)% / (0.0, 0.0)%.

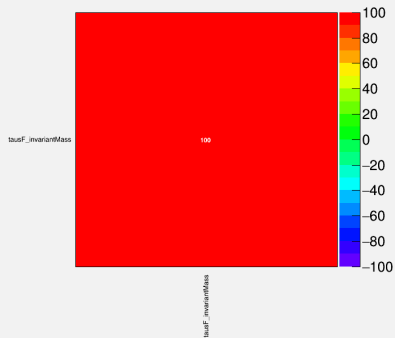
Correlation Matrix (background)

(1 input variables)

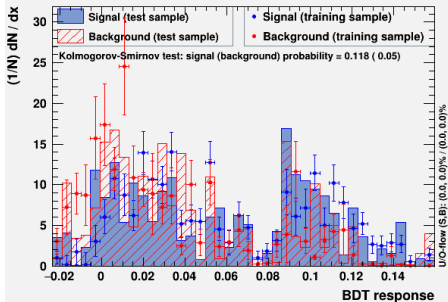


Correlation Matrix (signal)

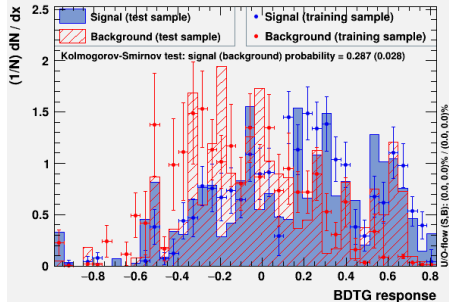
(1 input variables)



TMVA overtraining check for classifier: BDT(1 inputs)

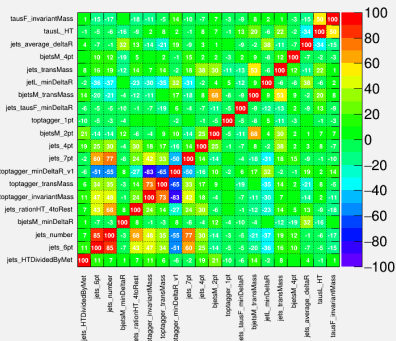


TMVA overtraining check for classifier: BDTG(1 inputs)



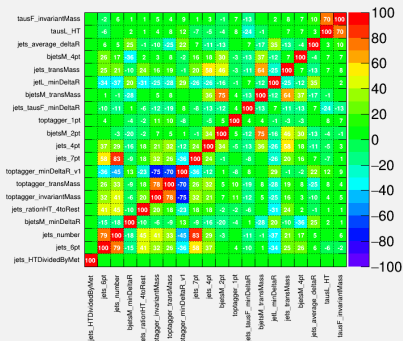
Correlation Matrix (background)

(20 input variables)

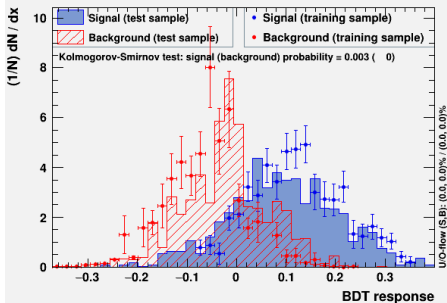


Correlation Matrix (signal)

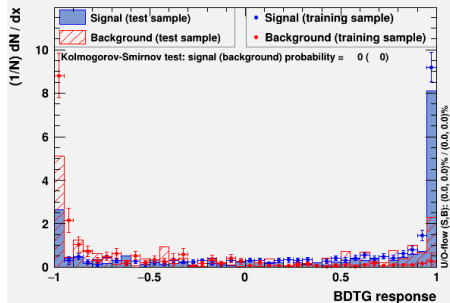
(20 input variables)



TMVA overtraining check for classifier: BDT(20 inputs)

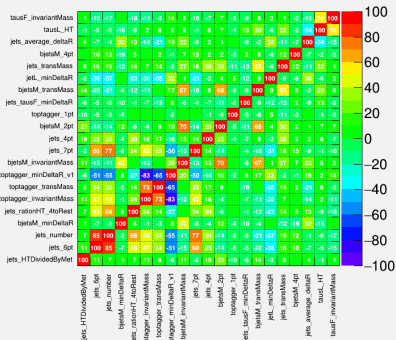


TMVA overtraining check for classifier: BDTG(20 inputs)



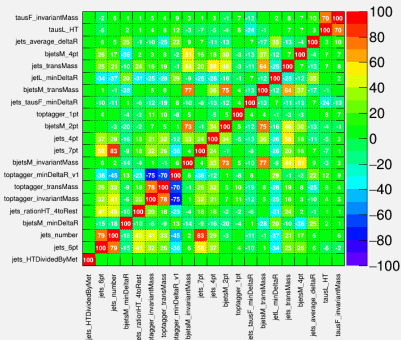
Correlation Matrix (background)

(21 input variables)

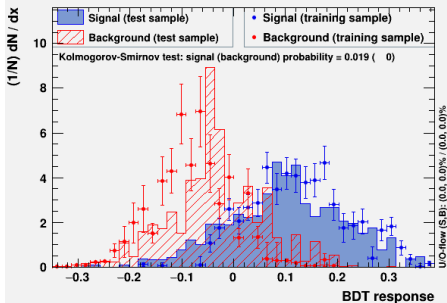


Correlation Matrix (signal)

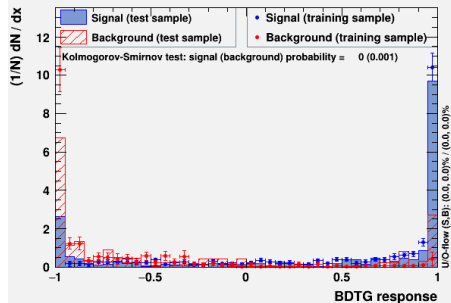
(21 input variables)



TMVA overtraining check for classifier: BDT(21 inputs)

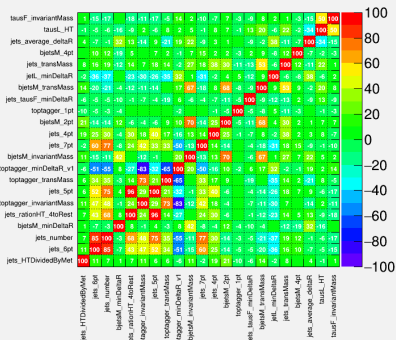


TMVA overtraining check for classifier: BDTG(21 inputs)



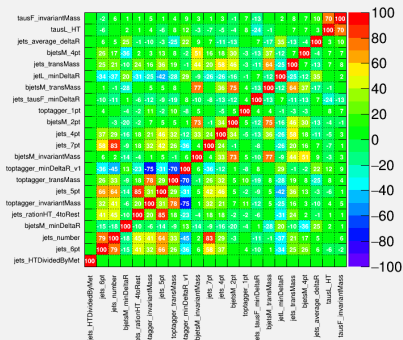
Correlation Matrix (background)

(22 input variables)

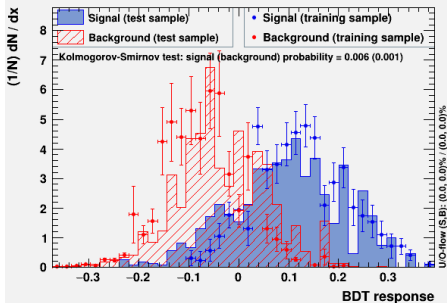


Correlation Matrix (signal)

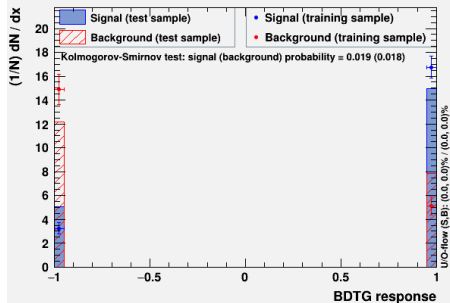
(22 input variables)



TMVA overtraining check for classifier: BDT(22 inputs)

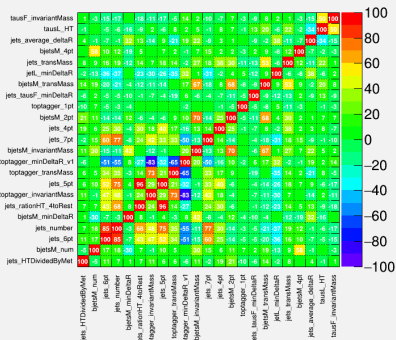


TMVA overtraining check for classifier: BDTG(22 inputs)



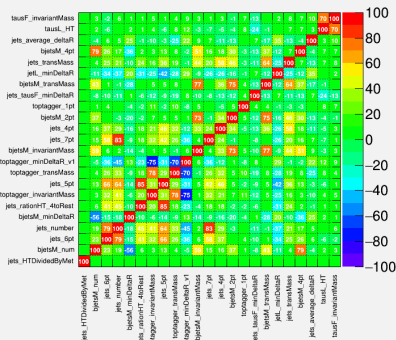
Correlation Matrix (background)

(23 input variables)

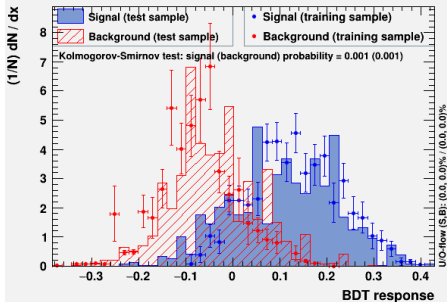


Correlation Matrix (signal)

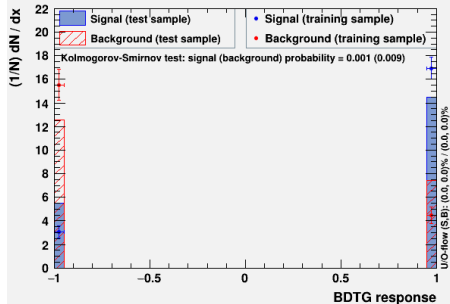
(23 input variables)



TMVA overtraining check for classifier: BDT(23 inputs)

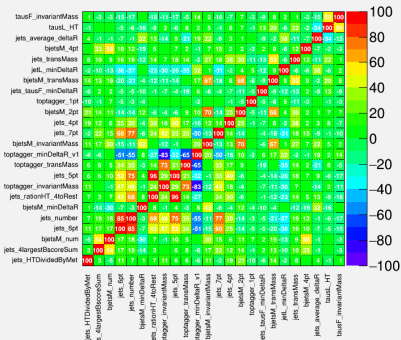


TMVA overtraining check for classifier: BDTG(23 inputs)



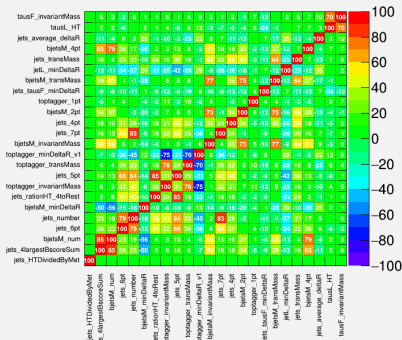
Correlation Matrix (background)

(24 input variables)

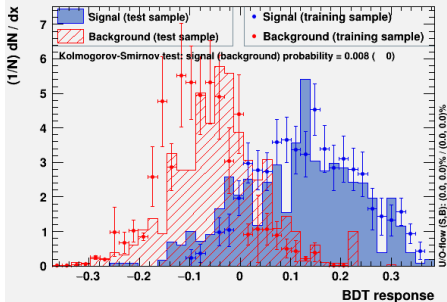


Correlation Matrix (signal)

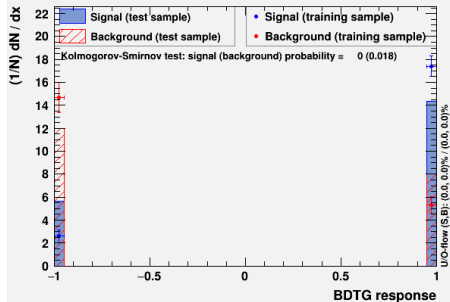
(24 input variables)



TMVA overtraining check for classifier: BDT(24 inputs)

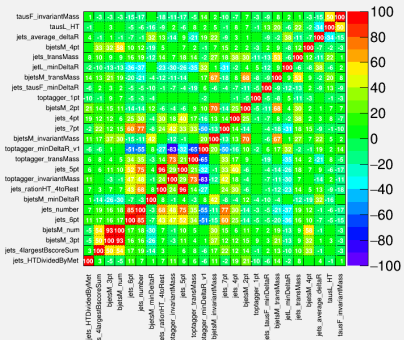


TMVA overtraining check for classifier: BDTG(24 inputs)



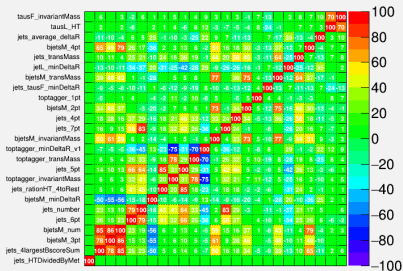
Correlation Matrix (background)

(25 input variables)

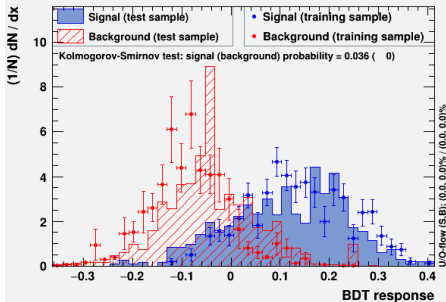


Correlation Matrix (signal)

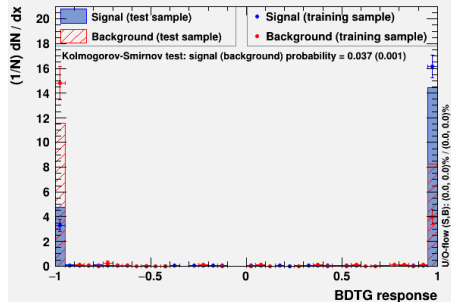
(25 input variables)



TMVA overtraining check for classifier: BDT(25 inputs)

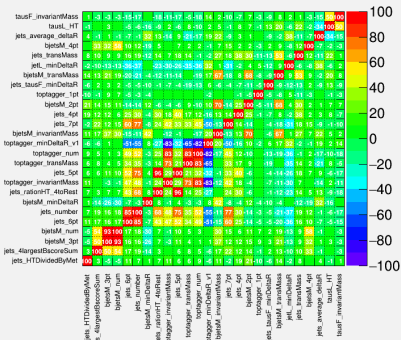


TMVA overtraining check for classifier: BDTG(25 inputs)



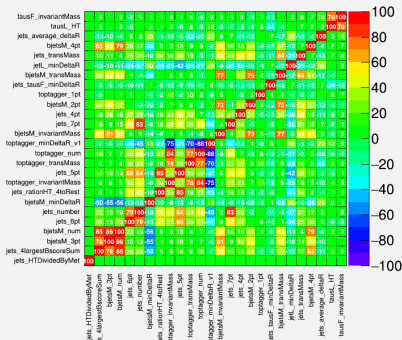
Correlation Matrix (background)

(26 input variables)

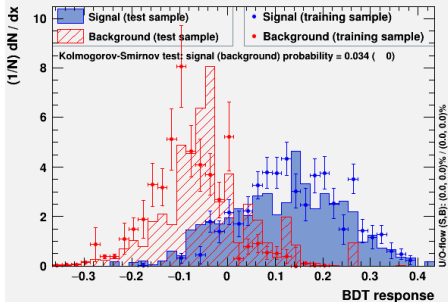


Correlation Matrix (signal)

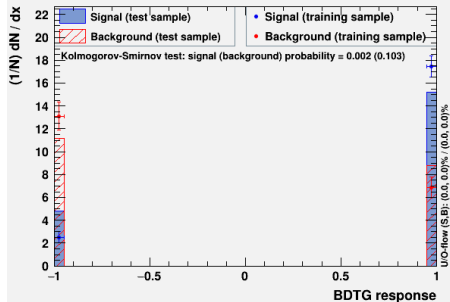
(26 input variables)



TMVA overtraining check for classifier: BDT(26 inputs)

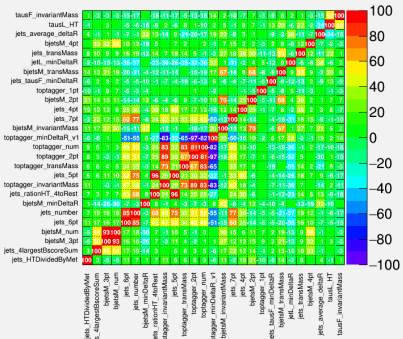


TMVA overtraining check for classifier: BDTG(26 inputs)



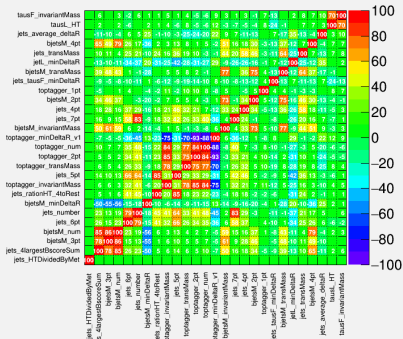
Correlation Matrix (background)

(27 input variables)

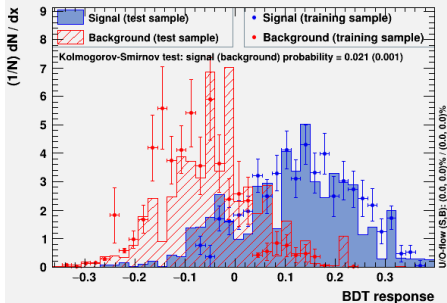


Correlation Matrix (signal)

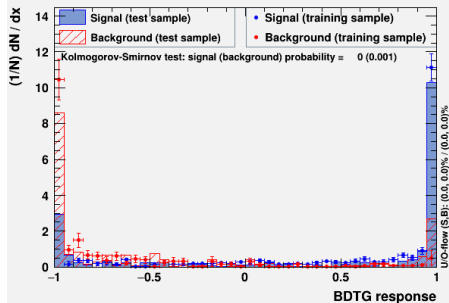
(27 input variables)



TMVA overtraining check for classifier: BDT(27 inputs)

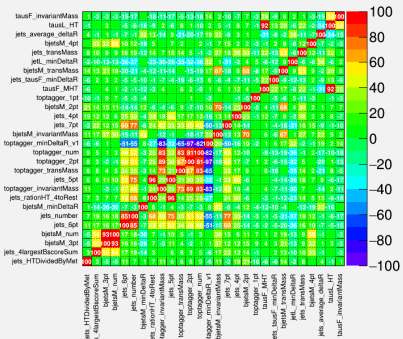


TMVA overtraining check for classifier: BDTG(27 inputs)



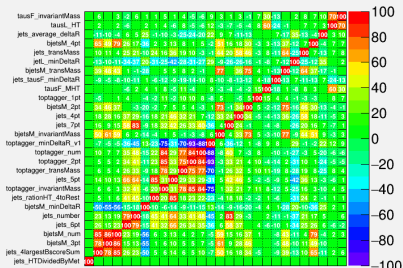
Correlation Matrix (background)

(28 input variables)

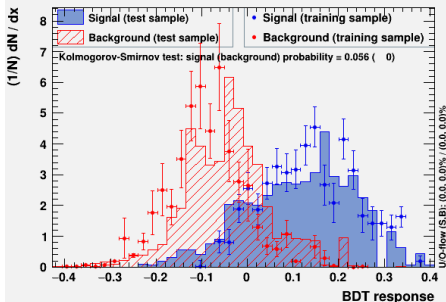


Correlation Matrix (signal)

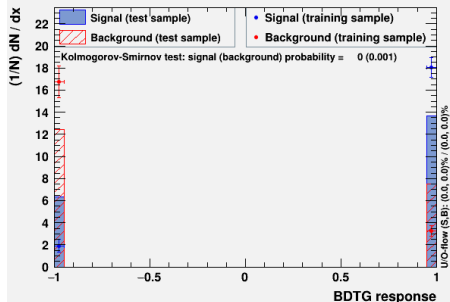
(28 input variables)



TMVA overtraining check for classifier: BDT(28 inputs)

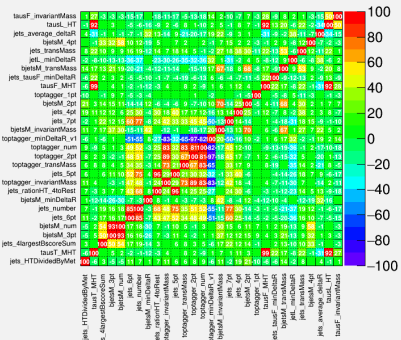


TMVA overtraining check for classifier: BDTG(28 inputs)



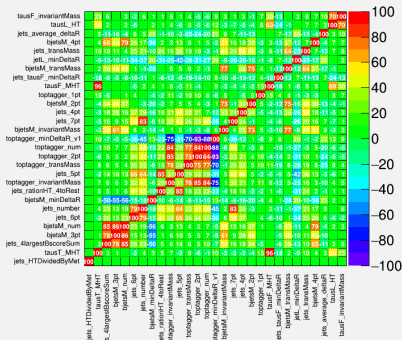
Correlation Matrix (background)

(29 input variables)

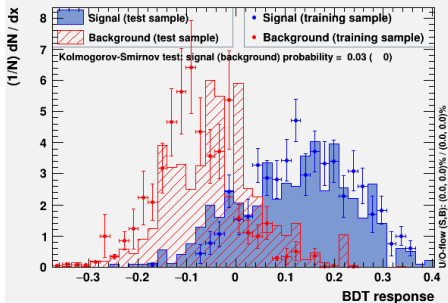


Correlation Matrix (signal)

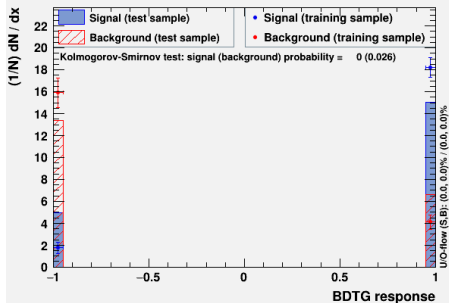
(29 input variables)



TMVA overtraining check for classifier: BDT(29 inputs)

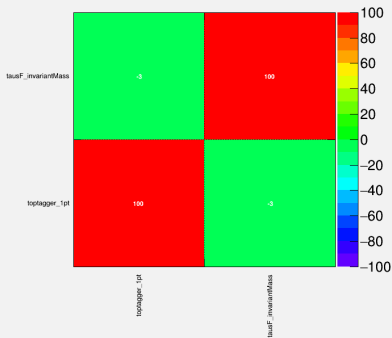


TMVA overtraining check for classifier: BDTG(29 inputs)



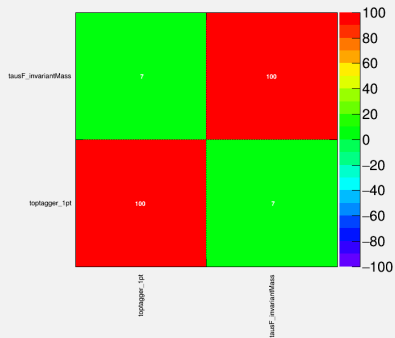
Correlation Matrix (background)

(2 input variables)

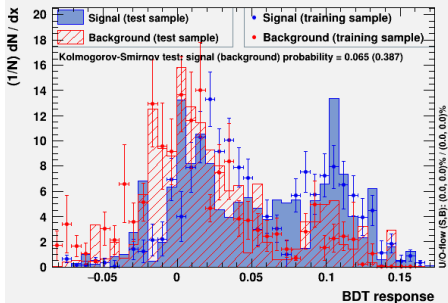


Correlation Matrix (signal)

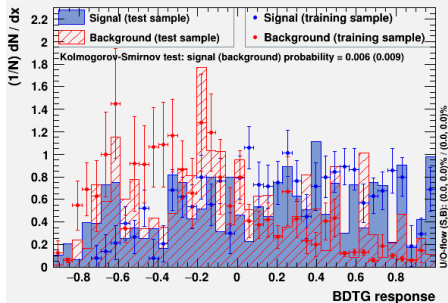
(2 input variables)



TMVA overtraining check for classifier: BDT(2 inputs)

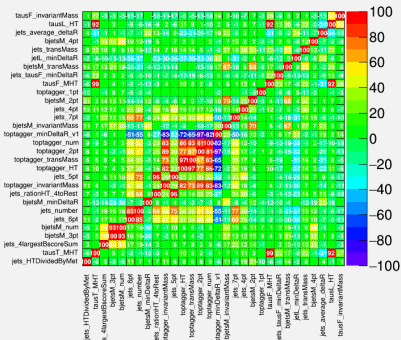


TMVA overtraining check for classifier: BDTG(2 inputs)



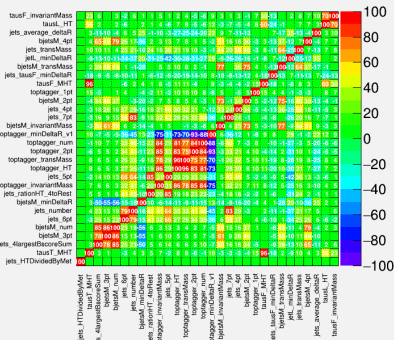
Correlation Matrix (background)

(30 input variables)

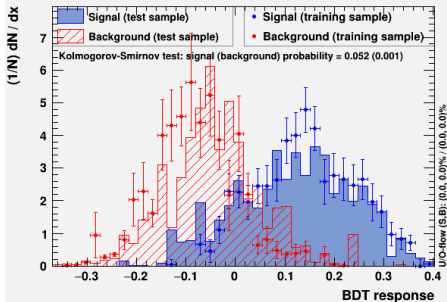


Correlation Matrix (signal)

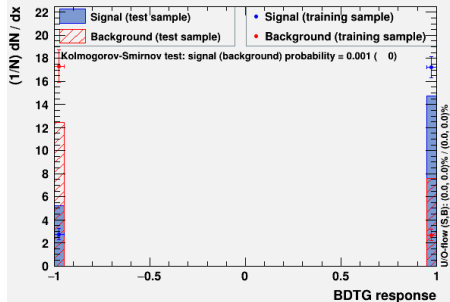
(30 input variables)



TMVA overtraining check for classifier: BDT(30 inputs)

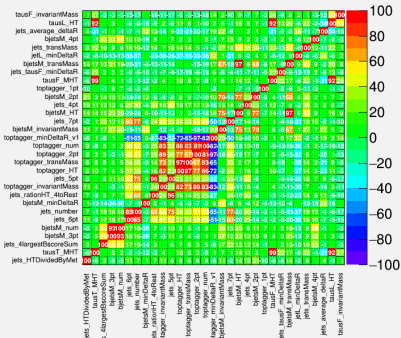


TMVA overtraining check for classifier: BDTG(30 inputs)



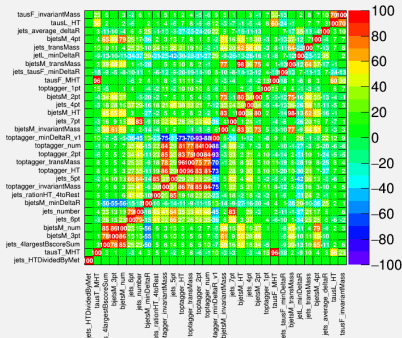
Correlation Matrix (background)

(31 input variables)

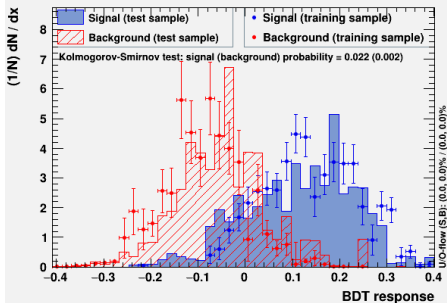


Correlation Matrix (signal)

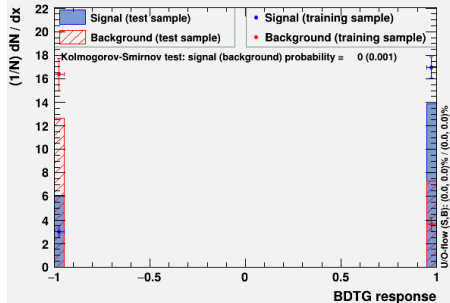
(31 input variables)



TMVA overtraining check for classifier: BDT(31 inputs)

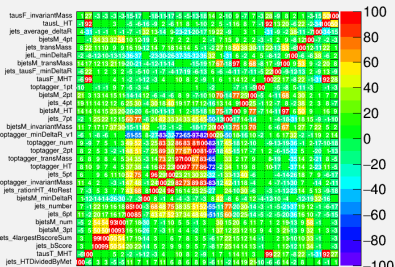


TMVA overtraining check for classifier: BDTG(31 inputs)



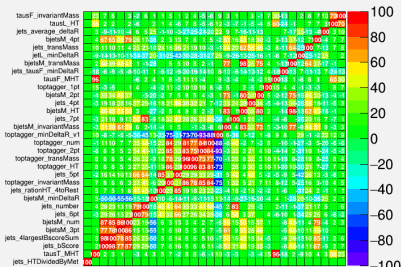
Correlation Matrix (background)

(32 input variables)

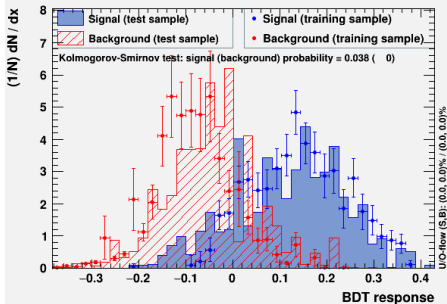


Correlation Matrix (signal)

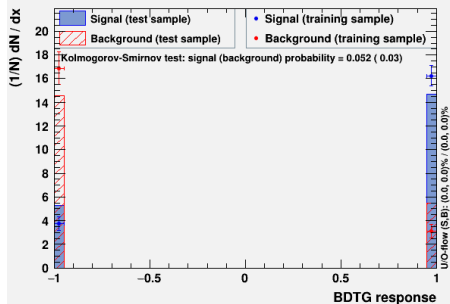
(32 input variables)



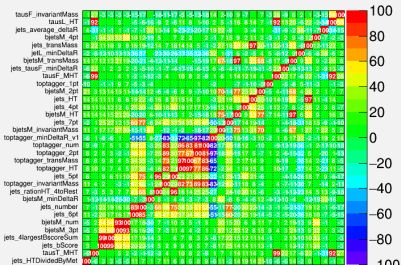
TMVA overtraining check for classifier: BDT(32 inputs)



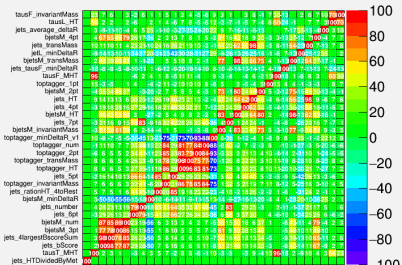
TMVA overtraining check for classifier: BDTG(32 inputs)



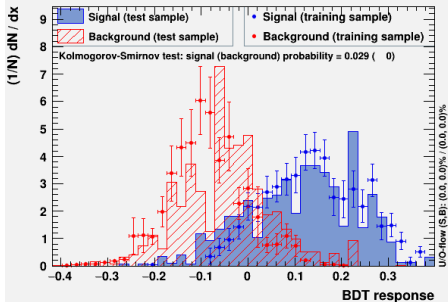
(33 input variables)



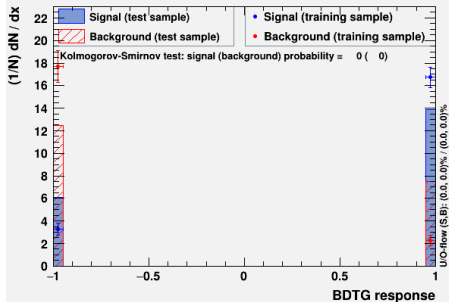
(33 input variables)



TMVA overtraining check for classifier: BDT(33 inputs)

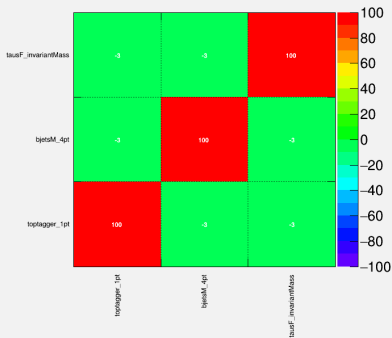


TMVA overtraining check for classifier: BDTG(33 inputs)



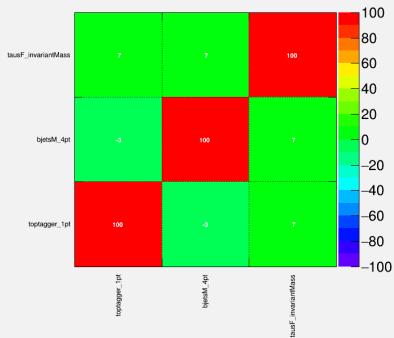
Correlation Matrix (background)

(3 input variables)

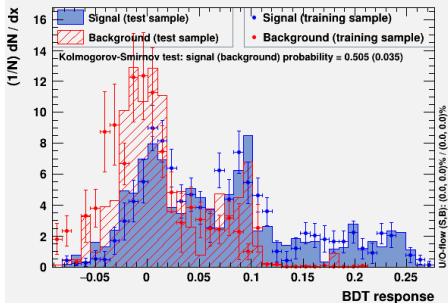


Correlation Matrix (signal)

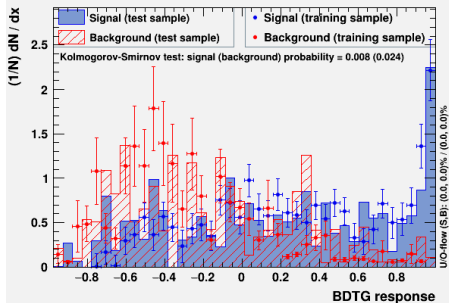
(3 input variables)



TMVA overtraining check for classifier: BDT(3 inputs)

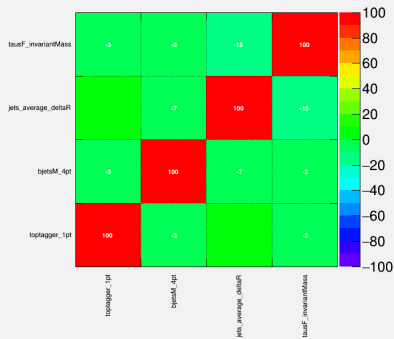


TMVA overtraining check for classifier: BDTG(3 inputs)



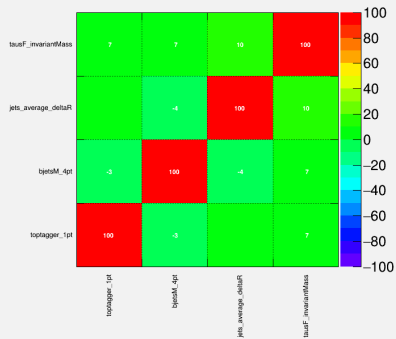
Correlation Matrix (background)

(4 input variables)

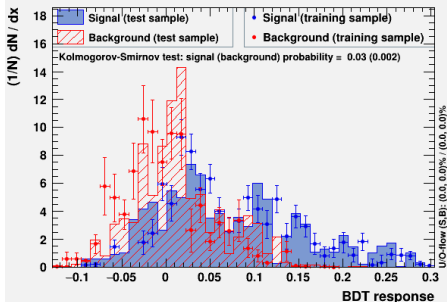


Correlation Matrix (signal)

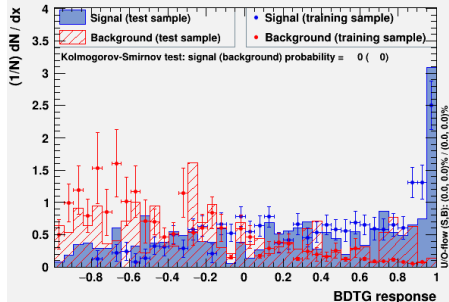
(4 input variables)



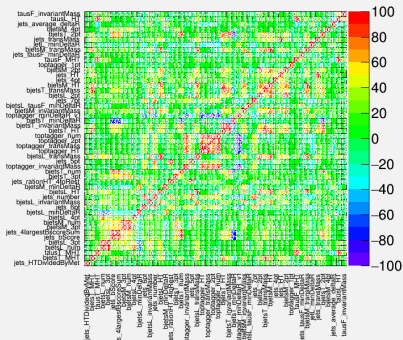
TMVA overtraining check for classifier: BDT(4 inputs)



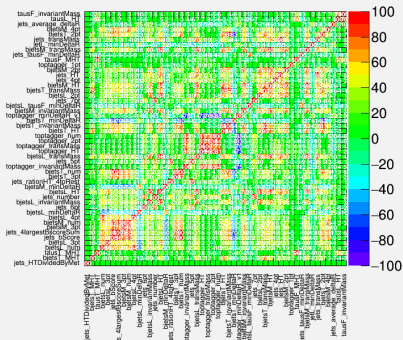
TMVA overtraining check for classifier: BDTG(4 inputs)



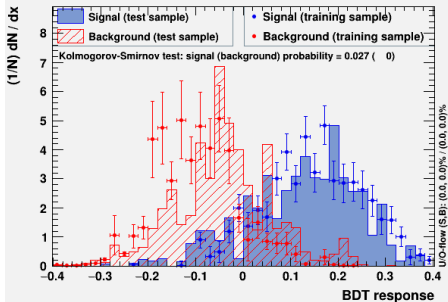
(50 input variables)



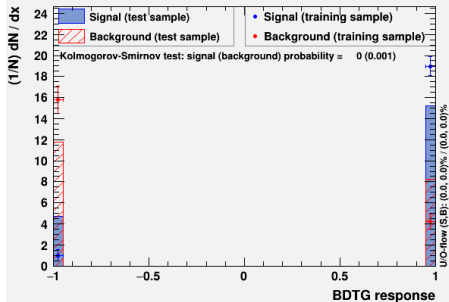
(50 input variables)



TMVA overtraining check for classifier: BDT(50 inputs)

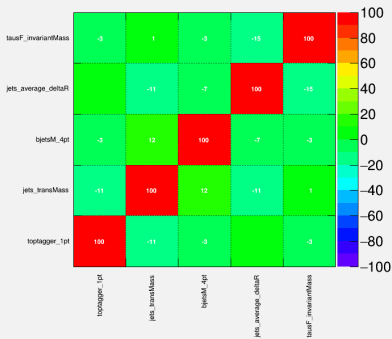


TMVA overtraining check for classifier: BDTG(50 inputs)



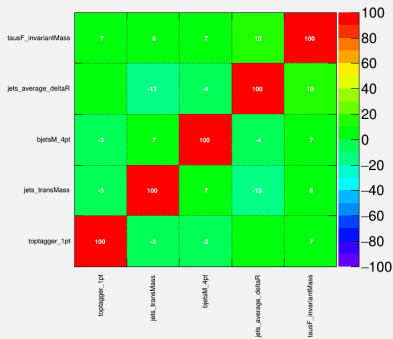
Correlation Matrix (background)

(5 input variables)

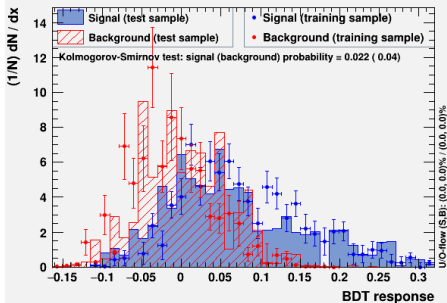


Correlation Matrix (signal)

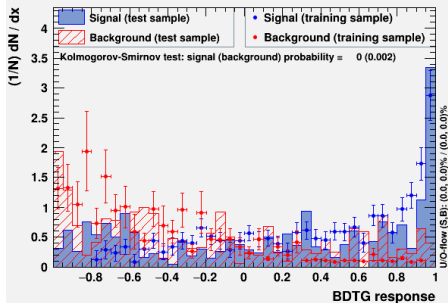
(5 input variables)



TMVA overtraining check for classifier: BDT(5 inputs)

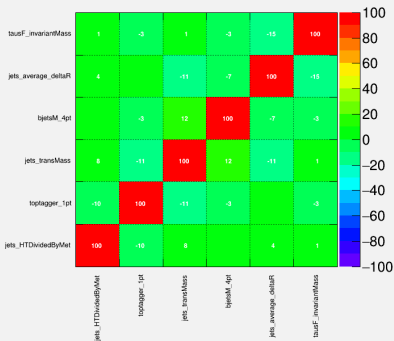


TMVA overtraining check for classifier: BDTG(5 inputs)



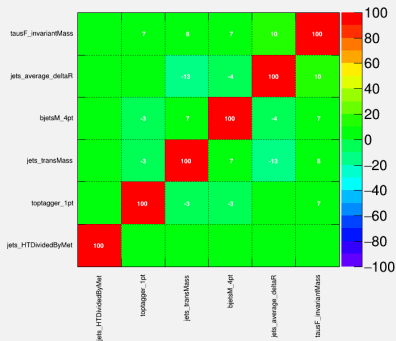
Correlation Matrix (background)

(6 input variables)

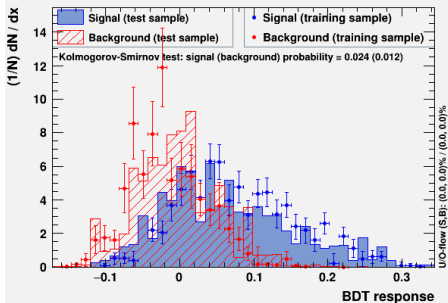


Correlation Matrix (signal)

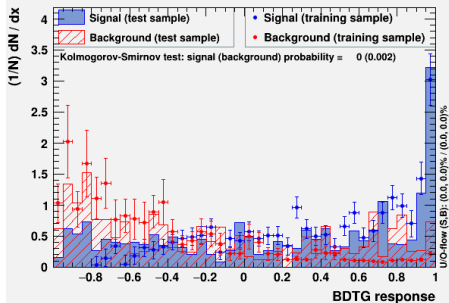
(6 input variables)



TMVA overtraining check for classifier: BDT(6 inputs)

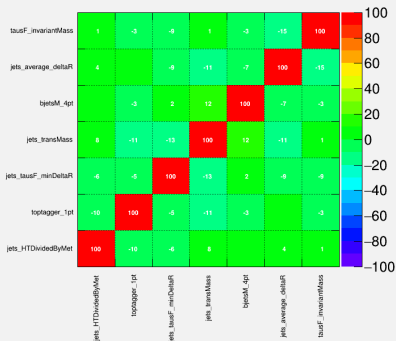


TMVA overtraining check for classifier: BDTG(6 inputs)



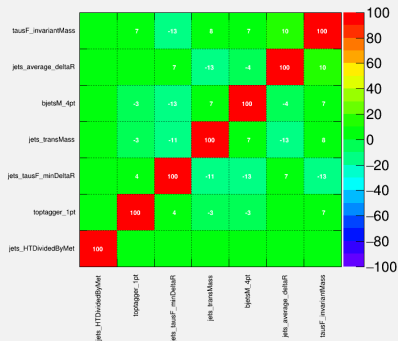
Correlation Matrix (background)

(7 input variables)

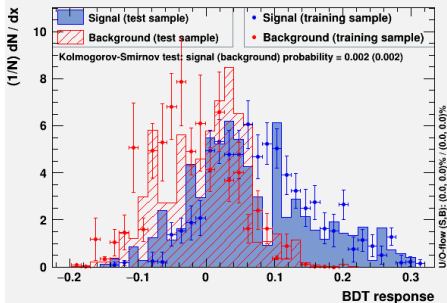


Correlation Matrix (signal)

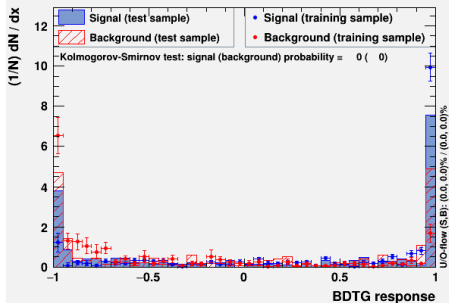
(7 input variables)



TMVA overtraining check for classifier: BDT(7 inputs)

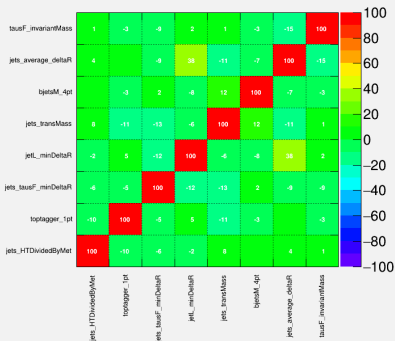


TMVA overtraining check for classifier: BDTG(7 inputs)



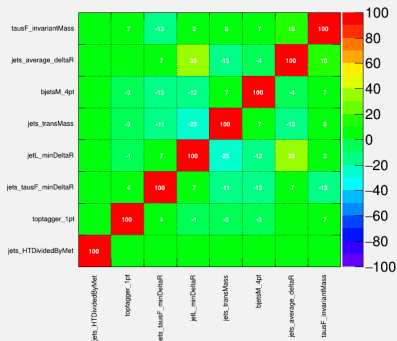
Correlation Matrix (background)

(8 input variables)

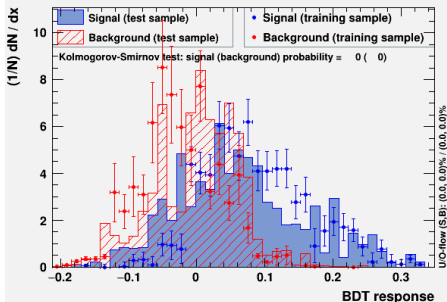


Correlation Matrix (signal)

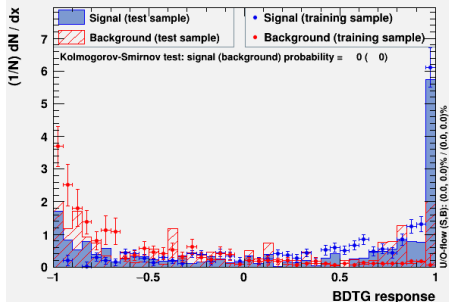
(8 input variables)



TMVA overtraining check for classifier: BDT(8 inputs)

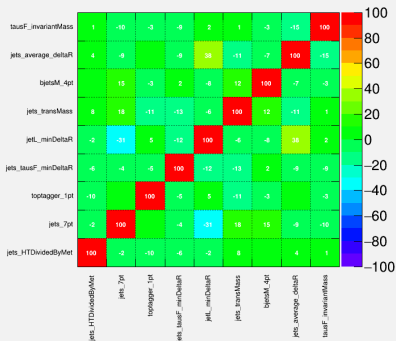


TMVA overtraining check for classifier: BDTG(8 inputs)



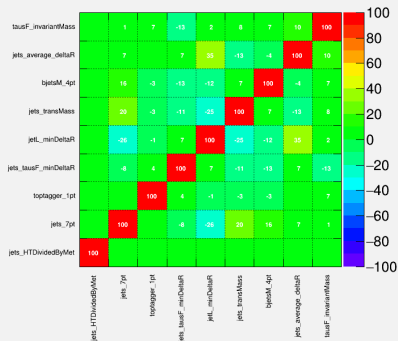
Correlation Matrix (background)

(9 input variables)

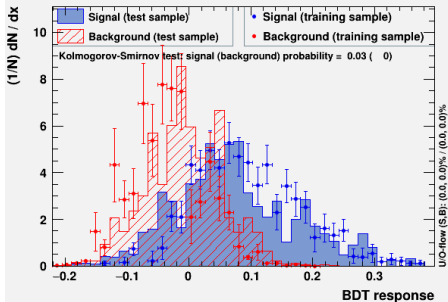


Correlation Matrix (signal)

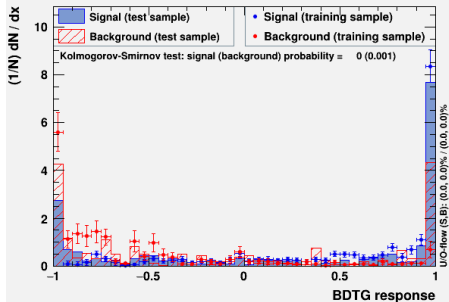
(9 input variables)



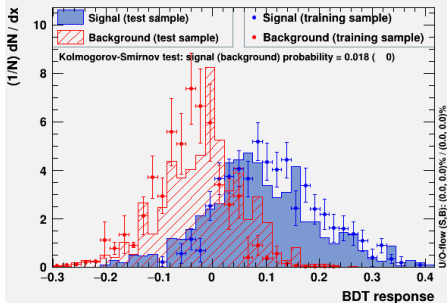
TMVA overtraining check for classifier: BDT(9 inputs)



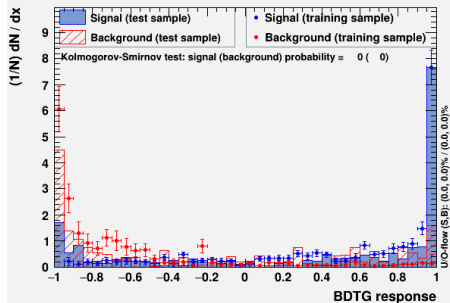
TMVA overtraining check for classifier: BDTG(9 inputs)



TMVA overtraining check for classifier: BDT(12 inputs)

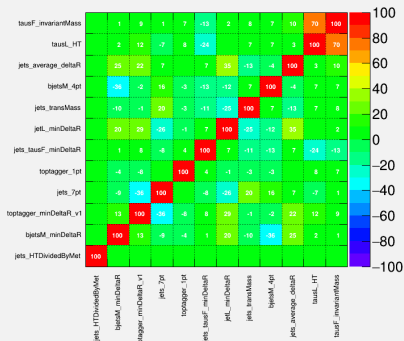


TMVA overtraining check for classifier: BDTG(12 inputs)



Correlation Matrix (signal)

(12 input variables)



Correlation Matrix (background)

(12 input variables)

