work status
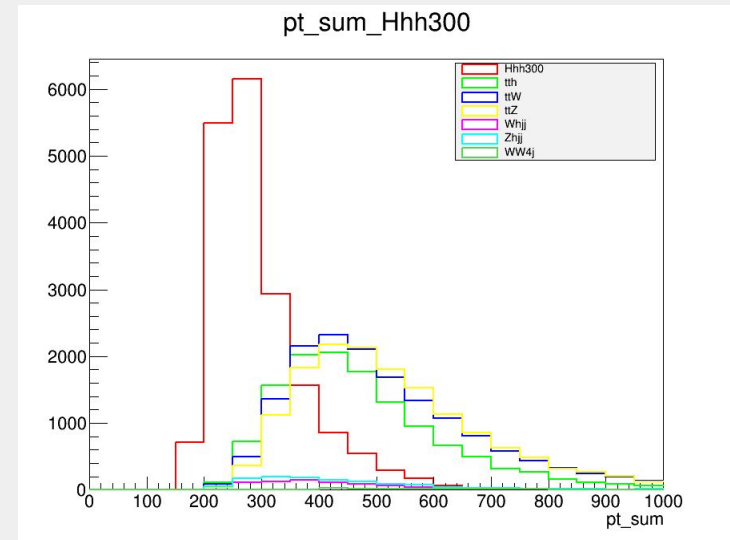
Maosen Zhou

07/12/2015

WWWW vs WWyy

- pre-selection: two same sign leptons, >=4 jets(including b jets)
- All xsecs are computed after pre-selection
- b-veto cut: reject events containing >=1 b jets
- Lumi=300 fb^{-1}

pp> jjjjll	xsec (fb)	b-veto	pt_sum < 300GeV
Hhh300	23	20	11.9
ttW	28.4	4.2	0.12
ttZ	21.7	3.3	0.06
WW4j	19.6	17.4	0.16
tth	12.6	1.8	0.06
Whjj	3.9	3.5	0.59
Zhjj	0.89	0.80	0.16
WZ4j	-		
ZZ4j	-		
$S/\sqrt{B}$	43	62	192
Significance(Z_0)	41	57	109

pt_sum_Hhh300

$pp \to \ell\nu\ell\nu\gamma\gamma$	Sum	Selection+Basic Cuts	$M_{\gamma\gamma}, \not{E}_T$	$M_T(\ell\ell\nu\nu\gamma\gamma), \Delta\phi(\ell\ell), \Delta R(\ell\ell)$
Signal (fb)	0.525	0.0257	0.019	0.0141
B[$\ell\nu\ell\nu\gamma\gamma+\ell\ell\gamma\gamma$] (fb)	153	0.935	0.00127	0.000153
$S/\sqrt{B}$	0.735	0.46	9.23	19.8
Significance(Z_0)	0.735	0.458	4.72	5.51

$pp \to q\bar{q}'\ell\nu\gamma\gamma$	Sum	Selection+Basic Cuts	$M_{\gamma\gamma}, M_{qq}, \not{E}_T$	$P_T(\gamma), M_T(q\bar{q}'\ell\nu)$
Signal (fb)	2.2	0.125	0.035	0.028
B[$q\bar{q}'\ell\nu\gamma\gamma$] (fb)	31.59	0.58	0.0015	0.00063
B[$\ell\nu\gamma\gamma$] (fb)	143.3	0.064	0.00072	0.00033
B[Wh] (fb)	0.42	0.0051	0.00025	0.00014
B[WWh] (fb)	0.0023	0.00021	0.00002	0.00001
S/B	0.0125	0.193	14.1	25.2
$S/\sqrt{B}$	2.88	2.69	12.1	14.6
Significance(Z_0)	2.87	2.61	6.33	6.34

BDT
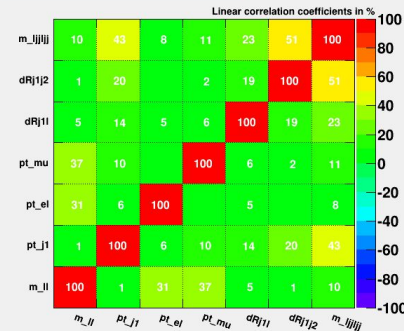
- ⊙ trained samples after pre-selection

- ⊙ all bkg are included according to their xsecs.

- ⊙ tried 7 variables:

  › m_ll, pt_j1, pt_el

  › m_ljjljj, pt_mu, dRj1l, dRj1j2

- ⊙ correlations seem OK

- ⊙ Results: 220+-24

```
Rank : Variable    : Variable Importance
------------------------------------------
   1 : n_m_ll      : 1.887e-01
   2 : n_pt_j1     : 1.656e-01
   3 : n_m_ljjljj  : 1.567e-01
   4 : n_pt_el     : 1.452e-01
   5 : n_pt_mu     : 1.343e-01
   6 : n_dRj1l     : 1.057e-01
   7 : n_dRj1j2    : 1.039e-01
```
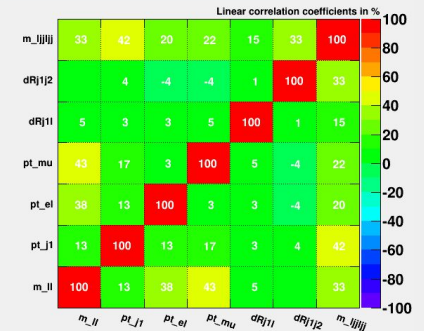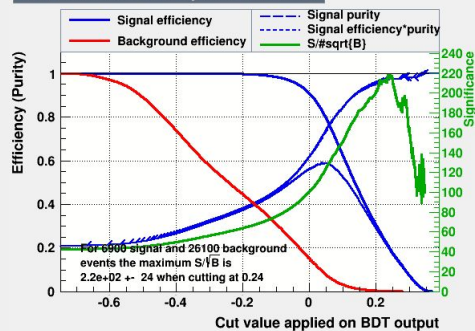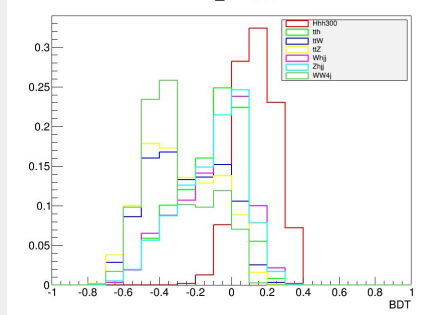

Correlation Matrix (signal)
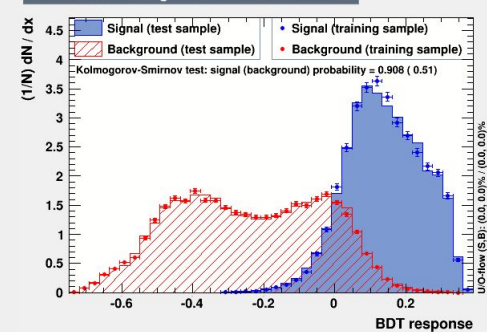

Correlation Matrix (background)

Cut efficiencies and optimal cut value

BDT_Hhh300

TMVA overtraining check for classifier: BDT

summary & to do

⊙ Added WZ4j and ZZ4j, but not ready

⊙ WWWW has much higher sensitivity than WWyy at 300 fb^{-1}

_____

⊙ finished one shift just now.

⊙ QT: start to look at seeding collections