Imperial College London

BDT first look

P. Dunne

Updates

- AN rough draft ready for reading: caveats sent in email to the list
- Phat noticed an error in the lumi calculation for run B
- Jobs rerunning with correct lumi weighting and trigger efficiency average

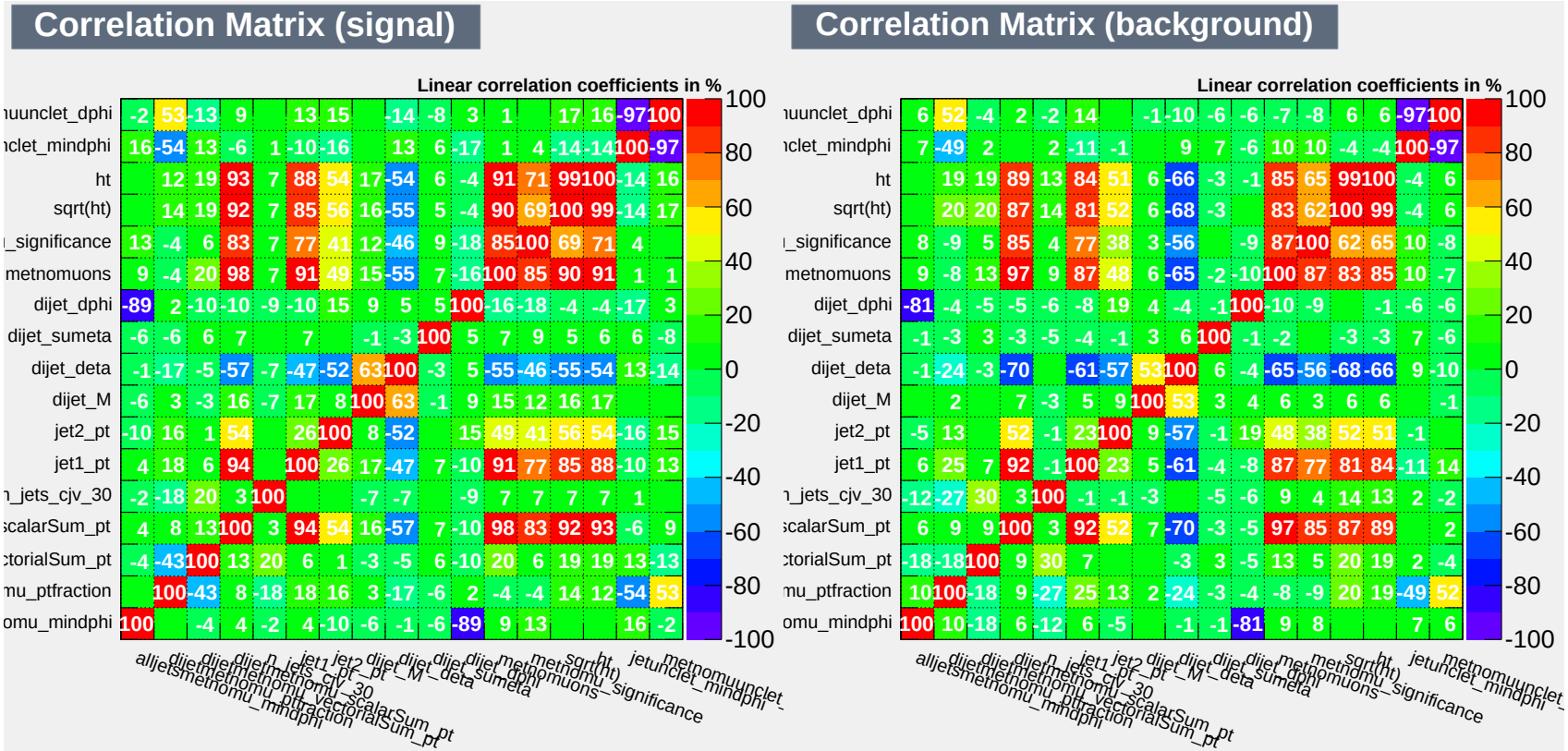
BDT Intro

- Have taken a very quick look at the BDT
- Have got data driven weights for backgrounds
- Start from signal region of cut based analysis
- Caveats:
  - Z samples not properly accounted for yet: this is being taken care of but samples aren't ready yet
  - Lumi bug mentioned by Phat yesterday not fixed in these slides - should be small effect
  - Haven't got expected limit effects

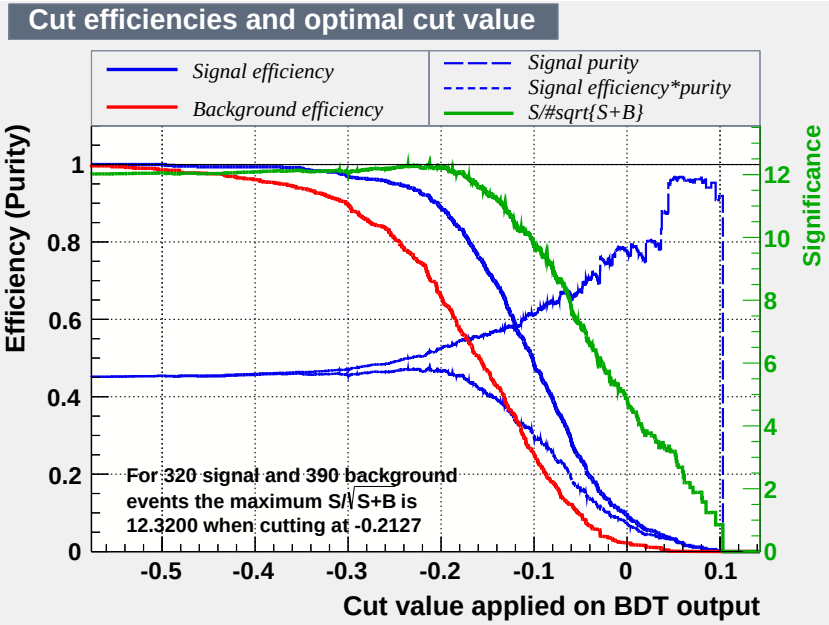
List of variables used

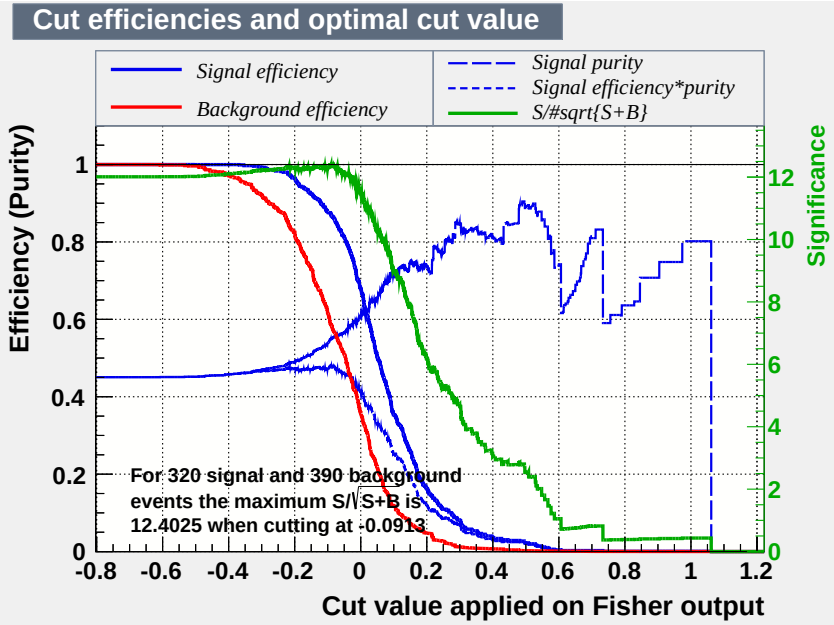
- alljetsmetnomu_mindphi
- dijetmetnomu_ptfraction
- dijetmetnomu_vectorialSum_pt
- dijetmetnomu_scalarSum_pt
- n_jets_cjv_30
- jet1_pt
- jet2_pt
- dijet_M
- dijet_deta
- dijet_sumeta
- dijet_dphi
- metnomuons
- metnomu_significance
- sqrt(ht)
- ht
- jetunclet_mindphi
- metnomuunclet_dphi

Correlation Plots

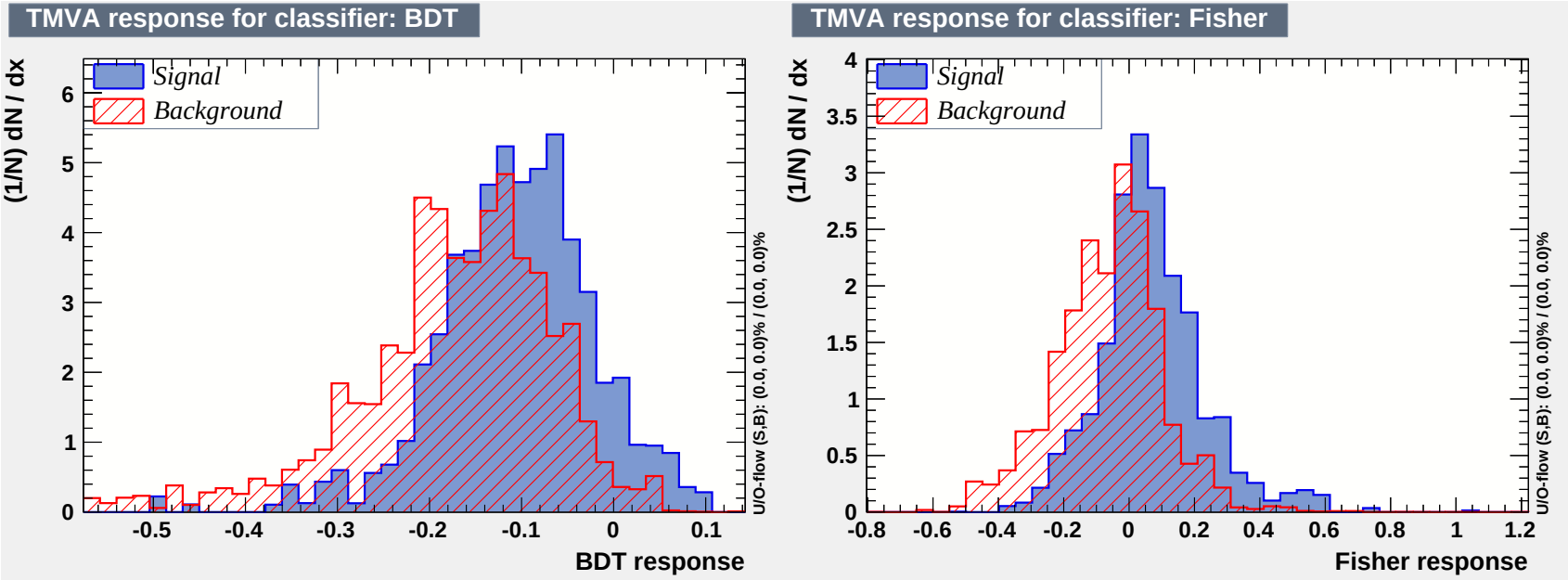


S over root B

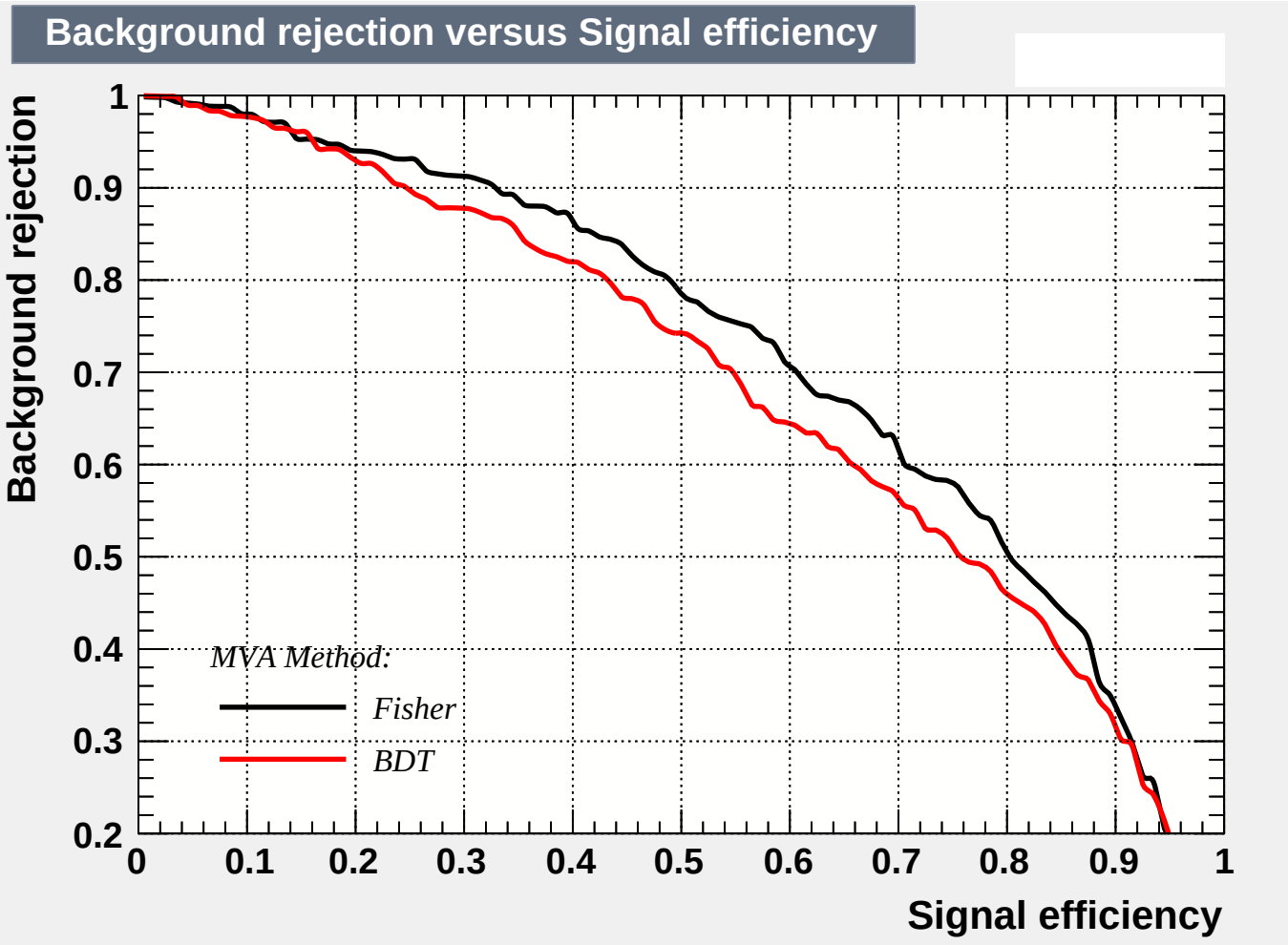

Cut efficiencies and optimal cut value
Signal efficiency
Background efficiency
Signal purity
Signal efficiency*purity
S/#sqrt{S+B}
Efficiency (Purity)
Significance
For 320 signal and 390 background events the maximum S/√S+B is 12.3200 when cutting at -0.2127
Cut value applied on BDT output


Cut efficiencies and optimal cut value
Signal efficiency
Background efficiency
Signal purity
Signal efficiency*purity
S/#sqrt{S+B}
Efficiency (Purity)
Significance
For 320 signal and 390 background events the maximum S/√S+B is 12.4025 when cutting at -0.0913
Cut value applied on Fisher output

Response


TMVA response for classifier: BDT
Signal
Background
(1/N) dN / dx
BDT response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%
TMVA response for classifier: Fisher
Signal
Background
(1/N) dN / dx
Fisher response
U/O-flow (S,B): (0.0, 0.0)% / (0.0, 0.0)%

ROC curve


Background rejection versus Signal efficiency
Background rejection
Signal efficiency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
MVA Method:
Fisher
BDT

Summary

- Doesn't look like MVA gives much improvement in $S/\sqrt{S+B}$
  - Current cuts very tight due to "cut all QCD" strategy
  - All remaining backgrounds are quite signal like
- Need to look at expected limit
- This was a very quick study, any hints on things I might have missed are welcome!

Backup