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Electron-faking-tau Veto Optimization in 2012

Introduction

This twiki provides documentation for the electron-faking-tau veto (eveto) reoptimization in autumn 2012.

The veto is a BDT made with TMVA and scripted via taumva. The veto is trained and tested on taus (signal) and electrons (background) from DY/Zlelep MC.

Contact Alex Tuna (tuna at cern dot ch) for questions or concerns about the measurement.

Plots

Plots of input variables can be found [here](#).

For now, plots of BDT investigations can be found in the Version notes section.

Input variables

17 variables were considered for the BDT. (Please alert Alex if the descriptions are incorrect!) Some notes are included.

- `absdeltaeta` : The difference between the cluster eta and the leading track eta.
 - ◆ Created by hand to mimic variables like `el_deltaEta1`, which are used in electron identification.
- `absdeltaphi` : The difference between the cluster phi and the leading track phi.
 - ◆ See notes for `absdeltaeta`.
- `calcVars_corrFTrk` : $1.0 / \text{etOverPtLeadTrk}$, with a `nVertex` correction.
- `calcVars_corrCentFrac` : Same as `seedCalo_centFrac`, with a `nVertex` correction applied.
- `calcVars_ChPiEMEOverCaloEME` : (Leading track momentum - energy of the HCAL) divided by the energy of the ECAL.
 - ◆ E3 is part of the HCAL term.
 - ◆ "Leading track momentum" is actually sum of track momenta, but here we only have one track.
- `calcVars_EMFractionAtEMScale_moveE3` : The fraction of energy deposited in the ECAL versus the energy deposited in the ECAL + HCAL.
 - ◆ Here, E3 is moved from the HCAL term to the ECAL term by hand.
 - ◆ This version of EMFraction is better modeled than the `d3pd` version because E3 is mis-modeled in 2012.
- `calcVars_pi0BDTPrimaryScore` : The score of the tau pi0 BDT.
 - ◆ This is not used in the training because the tight timescale does not allow for sufficient studies.
- `calcVars_PSSFraction` : The fraction of energy deposited in the pressampler plus strips versus the energy deposited in the ECAL + HCAL.
- `etOverPtLeadTrk` : The energy of the ECAL + HCAL divided by the momentum of the leading track.
 - ◆ Not used because it is redundant with `calcVars_corrFTrk`.
- `seedCalo_centFrac` : The amount of ECAL energy with $dR < 0.1$ divided by the total ECAL energy (does not include E3).
 - ◆ Not used because it is redundant with `calcVars_corrCentFrac`.
- `seedCalo_hadRadius` : The equivalent of `emRadius`, except in the HCAL.
 - ◆ Not used at high eta because the contribution of E3 is mis-modeled.

- `seedCalo_isolFrac` : The amount of ECAL energy in a dR ring from 0.1 to 0.2 divided by the total ECAL energy (does not include E3).
- `seedTrk_hadLeakEt` : The amount of energy in the zeroth layer of the HCAL divided by the leading track momentum.
- `seedTrk_secMaxStripEt` : The maximum single strip energy in a 100x3 eta/phi window of the strips.
 - ◆ Only used in the barrel because it is not well defined in the crack and for track eta > 1.7.
- `seedTrk_secMaxStripEtOverPt` : `seedTrk_secMaxStripEt` divided by the leading track momentum.
 - ◆ Created by hand to reduce momentum-dependence of `seedTrk_secMaxStripEt`.
- `seedTrk_sumEMCellEtOverLeadTrkPt` : The energy of the ECAL divided by the momentum of the leading track (includes E3).
 - ◆ Not used because it is redundant with `etOverPtLeadTrk` and `calcVars_corrFTrk`.
- `TRHTOverLT_LeadTrk` : The ratio of high threshold TRT hits to low threshold hits of the leading track.
 - ◆ Not used at high eta because the TRT coverage ends near 2.00.

Some helpful links for understanding how the input variables are made:

- [TauDetailsManager](#) (calcVars_*)
- [tauRec/TauCommonCalcVars](#) (more calcVars_*)
- [tauRec/TauElectronVetoVariables](#) (seedTrk_*)
- [tauRec/TauCellVariables](#) (seedCalo_*)

Grooming

Before being fed to `taumva`, taus from the `d3pd` are groomed as follows:

- $p_T > 20$ GeV
- eta (cluster) < 2.5
- numTrack = 1
- author = 1 | 3
- pass JetBDTLoose
- categorization:
 - ◆ signal:
 - ◇ `trueTauAssoc_index` >= 0
 - ◆ background:
 - ◇ Leading truth object in dR cone is electron or photon (same as 2012 SF measurement)
 - ◇ No overlap with tightPP electrons

Sample statistics

Sample	pT range (GeV)	eta range	# events
Ztautau	15 -- 60	0.00 -- 0.80	908166
Ztautau	15 -- 60	0.80 -- 1.37	606908
Ztautau	15 -- 60	1.37 -- 1.52	150065
Ztautau	15 -- 60	1.52 -- 2.00	484130
Ztautau	15 -- 60	2.00 -- 3.00	421871
Zee	15 -- 60	0.00 -- 0.80	541343
Zee	15 -- 60	0.80 -- 1.37	490158
Zee	15 -- 60	1.37 -- 1.52	494821
Zee	15 -- 60	1.52 -- 2.00	370932
Zee	15 -- 60	2.00 -- 3.00	246371
DYtautau	60 -- 999	0.00 -- 0.80	427489

DYtautau	60 -- 999	0.80 -- 1.37	214597
DYtautau	60 -- 999	1.37 -- 1.52	36633
DYtautau	60 -- 999	1.52 -- 2.00	89852
DYtautau	60 -- 999	2.00 -- 3.00	39533
DYee	60 -- 999	0.00 -- 0.80	43608
DYee	60 -- 999	0.80 -- 1.37	37467
DYee	60 -- 999	1.37 -- 1.52	99135
DYee	60 -- 999	1.52 -- 2.00	21086
DYee	60 -- 999	2.00 -- 3.00	13900

Version notes

v10-02 (2012-12-02-14h29m14s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
```

- 6 or 5 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- First training of endcap, low pT category. NB: secMaxStripEtOverPt and TRHTOverLT are not considered here because the variables are not valid in the endcap.
- Three N-1 trainings crashed.
- Some over-training, but not dramatic.
- Action item: Discuss with SM.

Input variable configuration	Sig eff for bkg @ 0.01
All 6 variables	0.810
Drop absdeltaeta	0.788
Drop corrFTrk	N/A
Drop EMFraction	0.691
Drop PSSFraction	N/A
Drop isolFrac	N/A
Drop hadLeakEt	0.776

v10-01 (2012-12-02-12h39m40s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
```

- 7 or 6 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)

- First training of endcap, low pT category. NB: secMaxStripEtOverPt and TRHTOverLT are not considered here because the variables are not valid in the endcap.
- No trainings crashed.
- Some over-training, but not dramatic.
- Action item: Remove `absdeltaphi`, retrain. Discuss with SM.

Input variable configuration	Sig eff for bkg @ 0.01
All 7 variables	0.824
Drop <code>absdeltaeta</code>	0.805
Drop <code>absdeltaphi</code>	0.810
Drop <code>corrFTrk</code>	0.792
Drop <code>EMFraction</code>	0.706
Drop <code>PSSFraction</code>	0.802
Drop <code>isolFrac</code>	0.798
Drop <code>hadLeakEt</code>	0.792

v10-00 (2012-12-02-12h08m03s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
```

- 8 or 7 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- First training of endcap, low pT category. NB: secMaxStripEtOverPt and TRHTOverLT are not considered here because the variables are not valid in the endcap.
- One N-1 training crashed, when `absdeltaphi` was removed.
- Some over-training, but not dramatic.
- Action item: Remove `corrCentFrac`, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 8 variables	0.827
Drop <code>absdeltaeta</code>	0.806
Drop <code>absdeltaphi</code>	N/A
Drop <code>corrFTrk</code>	0.797
Drop <code>corrCentFrac</code>	0.824
Drop <code>EMFraction</code>	0.714
Drop <code>PSSFraction</code>	0.806
Drop <code>isolFrac</code>	0.819
Drop <code>hadLeakEt</code>	0.797

v09-03 (2012-12-02-11h47m19s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
```

v10-01 (2012-12-02-12h39m40s)

```
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedTrk_hadLeakEt
tau_TRHTOverLT_LeadTrk
```

- 6 or 5 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- NB: secMaxStripEtOverPt is not considered here because the variable is not filled in the crack.
- No trainings crashed.
- Minor over-training.
- Action item: Move to next kinematic category.

Input variable configuration	Sig eff for bkg @ 0.01
All 6 variables	0.863
Drop absdeltaeta	0.821
Drop corrFTrk	0.827
Drop EMFraction	0.816
Drop PSSFraction	0.839
Drop hadLeakEt	0.826
Drop TRHTOverLT	0.746

v09-02 (2012-12-02-11h24m34s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedTrk_hadLeakEt
tau_TRHTOverLT_LeadTrk
```

- 7 or 6 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- NB: secMaxStripEtOverPt is not considered here because the variable is not filled in the crack.
- One N-1 training crashed, when EMFraction was removed.
- Some over-training, but not dramatic.
- Action item: Remove absdeltaphi, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 7 variables	0.878
Drop absdeltaeta	0.844
Drop absdeltaphi	0.863
Drop corrFTrk	0.837
Drop EMFraction	N/A
Drop PSSFraction	0.855
Drop hadLeakEt	0.846
Drop TRHTOverLT	0.755

v09-01 (2012-12-02-10h58m10s)

Show input variables Collapse input variables

v09-03 (2012-12-02-11h47m19s)

tau_absdeltaeta
 tau_absdeltaphi
 tau_calcVars_corrFTrk
 tau_calcVars_EMFractionAtEMScale_moveE3
 tau_calcVars_PSSFraction
 tau_seedCalo_isolFrac
 tau_seedTrk_hadLeakEt
 tau_TRHTOverLT_LeadTrk

- 8 or 7 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- NB: secMaxStripEtOverPt is not considered here because the variable is not filled in the crack.
- No trainings crashed.
- Some over-training, but not dramatic.
- Action item: Remove `isolFrac`, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 8 variables	0.890
Drop absdeltaeta	0.858
Drop absdeltaphi	0.875
Drop corrFTrk	0.856
Drop EMFraction	0.851
Drop PSSFraction	0.863
Drop isolFrac	0.878
Drop hadLeakEt	0.866
Drop TRHTOverLT	0.774

v09-00 (2012-12-02-10h27m51s)

Show input variables Collapse input variables

tau_absdeltaeta
 tau_absdeltaphi
 tau_calcVars_corrFTrk
 tau_calcVars_corrCentFrac
 tau_calcVars_EMFractionAtEMScale_moveE3
 tau_calcVars_PSSFraction
 tau_seedCalo_isolFrac
 tau_seedTrk_hadLeakEt
 tau_TRHTOverLT_LeadTrk

- 9 or 8 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- First training of barrel extended, low pT category. NB: secMaxStripEtOverPt is not considered here because the variable is not filled in the crack.
- No trainings crashed.
- Some over-training, but not dramatic.
- Action item: Remove `corrCentFrac`, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 9 variables	0.893
Drop absdeltaeta	0.862
Drop absdeltaphi	0.878
Drop corrFTrk	0.860

v09-01 (2012-12-02-10h58m10s)

Drop corrCentFrac	0.890
Drop EMFraction	0.857
Drop PSSFraction	0.869
Drop isolFrac	0.887
Drop hadLeakEt	0.869
Drop TRHTOverLT	0.781

v08-04 (2012-12-02-10h09m54s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_seedTrk_hadLeakEt
tau_TRHTOverLT_LeadTrk
```

- 5 or 4 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- NB: secMaxStripEtOverPt is not considered here because the variable is not filled in the crack.
- No trainings crashed.
- Minimal over-training.
- Action item: Move to next kinematic category.

Input variable configuration	Sig eff for bkg @ 0.01
All 5 variables	0.846
Drop absdeltaeta	0.806
Drop corrFTrk	0.816
Drop corrCentFrac	0.813
Drop hadLeakEt	0.724
Drop TRHTOverLT	0.645

v08-03 (2012-12-02-09h50m28s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_seedTrk_hadLeakEt
tau_TRHTOverLT_LeadTrk
```

- 6 or 5 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- NB: secMaxStripEtOverPt is not considered here because the variable is not filled in the crack.
- No trainings crashed.
- Some over-training, but not dramatic.
- Action item: Remove absdeltaphi, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 6 variables	0.867
Drop absdeltaeta	0.831
Drop absdeltaphi	0.846

Drop corrFTrk	0.827
Drop corrCentFrac	0.840
Drop hadLeakEt	0.748
Drop TRHTOverLT	0.669

v08-02 (2012-12-02-08h59m45s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_PSSFraction
tau_seedTrk_hadLeakEt
tau_TRHTOverLT_LeadTrk
```

- 7 or 6 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [?](#)
- NB: secMaxStripEtOverPt is not considered here because the variable is not filled in the crack.
- No trainings crashed.
- Some over-training, but not dramatic.
- Action item: Remove PSSFraction, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 7 variables	0.888
Drop absdeltaeta	0.859
Drop absdeltaphi	0.865
Drop corrFTrk	0.858
Drop corrCentFrac	0.864
Drop PSSFraction	0.867
Drop hadLeakEt	0.847
Drop TRHTOverLT	0.727

v08-01 (2012-12-02-08h34m42s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedTrk_hadLeakEt
tau_TRHTOverLT_LeadTrk
```

- 8 or 7 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [?](#)
- NB: secMaxStripEtOverPt is not considered here because the variable is not filled in the crack.
- No trainings crashed.
- Some over-training, but not dramatic.
- Action item: Remove EMFraction, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
------------------------------	------------------------

v08-03 (2012-12-02-09h50m28s)

All 8 variables	0.899
Drop absdeltaeta	0.868
Drop absdeltaphi	0.877
Drop corrFTrk	0.872
Drop corrCentFrac	0.876
Drop EMFraction	0.888
Drop PSSFraction	0.879
Drop hadLeakEt	0.868
Drop TRHTOverLT	0.750

v08-00 (2012-12-02-07h59m12s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_TRHTOverLT_LeadTrk
```

- 9 or 8 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- First training of crack, low pT category. NB: secMaxStripEtOverPt is not considered here because the variable is not filled in the crack.
- No trainings crashed.
- Some over-training, but not dramatic.
- Action item: Remove `isolFrac`, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 9 variables	0.899
Drop absdeltaeta	0.870
Drop absdeltaphi	0.882
Drop corrFTrk	0.875
Drop corrCentFrac	0.896
Drop EMFraction	0.892
Drop PSSFraction	0.883
Drop isolFrac	0.899
Drop hadLeakEt	0.868
Drop TRHTOverLT	0.760

v07-04 (2012-12-02-06h54m45s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

v08-01 (2012-12-02-08h34m42s)

- 6 or 5 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- No trainings crashed.
- Negligible over-training.
- No obvious input variable candidate for removal.
- Action item: Discuss with SM. Move to next kinematic category.

Input variable configuration	Sig eff for bkg @ 0.01
All 6 variables	0.805
Drop absdeltaeta	0.740
Drop corrFTrk	0.726
Drop EMFraction	0.759
Drop hadLeakEt	0.748
Drop secMaxStripEtOverPt	0.735
Drop TRHTOverLT	0.662

v07-03 (2012-12-02-06h32m05s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 7 or 6 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- One N-1 training crashed, when corrFTrk was removed.
- Some over-training, but not dramatic, and reduced from previous iteration.
- Action item: Remove PSSFraction, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 7 variables	0.820
Drop absdeltaeta	0.757
Drop corrFTrk	N/A
Drop EMFraction	0.779
Drop PSSFraction	0.805
Drop hadLeakEt	0.781
Drop secMaxStripEtOverPt	0.762
Drop TRHTOverLT	0.698

v07-02 (2012-12-02-05h05m16s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
```

v07-04 (2012-12-02-06h54m45s)

tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk

- 8 or 7 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- No trainings crashed.
- Some over-training, but not dramatic, and reduced from previous iteration.
- Action item: Remove `isolFrac`, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 8 variables	0.835
Drop <code>absdeltaeta</code>	0.775
Drop <code>corrFTrk</code>	0.785
Drop <code>EMFraction</code>	0.815
Drop <code>PSSFraction</code>	0.818
Drop <code>isolFrac</code>	0.820
Drop <code>hadLeakEt</code>	0.815
Drop <code>secMaxStripEtOverPt</code>	0.789
Drop <code>TRHTOverLT</code>	0.718

v07-01 (2012-12-02-04h37m07s)

Show input variables Collapse input variables

tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk

- 9 or 8 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- Two N-1 training crashed, when `isolFrac` or `secMaxStripEtOverPt` was removed.
- Some over-training, but not dramatic.
- Action item: Remove `absdeltaphi`, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 9 variables	0.853
Drop <code>absdeltaeta</code>	0.804
Drop <code>absdeltaphi</code>	0.835
Drop <code>corrFTrk</code>	0.802
Drop <code>EMFraction</code>	0.828
Drop <code>PSSFraction</code>	0.833
Drop <code>isolFrac</code>	N/A
Drop <code>hadLeakEt</code>	0.835
Drop <code>secMaxStripEtOverPt</code>	N/A
Drop <code>TRHTOverLT</code>	0.729

v07-00 (2012-12-02-03h59m35s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 10 or 9 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- First training of barrel outer, low pT category.
- One N-1 training crashed, when `isolFrac` was removed.
- Some over-training, but not dramatic.
- Action item: Remove `corrCentFrac`, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 10 variables	0.856
Drop <code>absdeltaeta</code>	0.809
Drop <code>absdeltaphi</code>	0.841
Drop <code>corrFTrk</code>	0.806
Drop <code>corrCentFrac</code>	0.853
Drop <code>EMFraction</code>	0.834
Drop <code>PSSFraction</code>	0.840
Drop <code>isolFrac</code>	N/A
Drop <code>hadLeakEt</code>	0.837
Drop <code>secMaxStripEtOverPt</code>	0.813
Drop <code>TRHTOverLT</code>	0.738

v06-04 (2012-12-01-17h42m19s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 6 or 5 input variables, 20 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- Two N-1 trainings crashed, when `absdeltaeta` or `corrFTrk` was removed.
- Still over-training, but improved from previous iteration.
- Action item: Discuss with SM. No obvious candidate for removal.

Input variable configuration	Sig eff for bkg @ 0.01
All 6 variables	0.786
Drop <code>absdeltaeta</code>	N/A

Drop corrFTrk	N/A
Drop EMFraction	0.753
Drop hadLeakEt	0.647
Drop secMaxStripEtOverPt	0.753
Drop TRHTOverLT	0.651

v06-03 (2012-12-01-17h34m29s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 7 or 6 input variables, 20 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- One N-1 trainings crashed, when `absdeltaeta` was removed.
- Still significant over-training, but improved from previous iteration.
- Action item: Remove `isolFrac`, retrain in hope over-training is reduced with fewer input variables.

Input variable configuration	Sig eff for bkg @ 0.01
All 7 variables	0.801
Drop absdeltaeta	N/A
Drop corrFTrk	0.756
Drop EMFraction	0.779
Drop isolFrac	0.786
Drop hadLeakEt	0.693
Drop secMaxStripEtOverPt	0.762
Drop TRHTOverLT	0.684

v06-02 (2012-12-01-17h25m55s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 8 or 7 input variables, 20 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- Two N-1 trainings crashed, when `isolFrac` or `absdeltaeta` was removed.
- Still significant over-training, but improved from previous iteration.
- Action item: Remove `absdeltaphi`, retrain in hope over-training is reduced with fewer input variables.

Input variable configuration	Sig eff for bkg @ 0.01
------------------------------	------------------------

v06-04 (2012-12-01-17h42m19s)

All 8 variables	0.805
Drop absdeltaeta	N/A
Drop absdeltaphi	0.801
Drop corrFTrk	0.764
Drop EMFraction	0.775
Drop isolFrac	N/A
Drop hadLeakEt	0.715
Drop secMaxStripEtOverPt	0.758
Drop TRHTOverLT	0.691

v06-01 (2012-12-01-17h17m14s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 9 or 8 input variables, 20 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- One N-1 training crashed, when `isolFrac` was removed.
- Still significant over-training.
- Action item: Remove `corrCentFrac`, retrain in hope over-training is reduced with fewer input variables.

Input variable configuration	Sig eff for bkg @ 0.01
All 9 variables	0.810
Drop absdeltaeta	0.792
Drop absdeltaphi	0.804
Drop corrFTrk	0.763
Drop corrCentFrac	0.805
Drop EMFraction	0.789
Drop isolFrac	N/A
Drop hadLeakEt	0.734
Drop secMaxStripEtOverPt	0.771
Drop TRHTOverLT	0.697

v06-00 (2012-12-01-17h07m32s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedCalo_isolFrac
```

v06-02 (2012-12-01-17h25m55s)

tau_seedTrk_hadLeakEt
 tau_seedTrk_secMaxStripEtOverPt
 tau_TRHTOverLT_LeadTrk

- 10 or 9 input variables, 20 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- First training of merge barrel, high pT category.
- No trainings crashed.
- Still significant over-training.
- Action item: Remove `PSSFraction`, retrain in hope over-training is reduced with fewer input variables.

Input variable configuration	Sig eff for bkg @ 0.01
All 10 variables	0.817
Drop <code>absdeltaeta</code>	0.797
Drop <code>absdeltaphi</code>	0.803
Drop <code>corrFTrk</code>	0.777
Drop <code>corrCentFrac</code>	0.810
Drop <code>EMFraction</code>	0.791
Drop <code>PSSFraction</code>	0.810
Drop <code>isolFrac</code>	0.803
Drop <code>hadLeakEt</code>	0.738
Drop <code>secMaxStripEtOverPt</code>	0.787
Drop <code>TRHTOverLT</code>	0.712

v05-02 (2012-12-01-16h21m03s)

Show input variables Collapse input variables

tau_absdeltaeta
 tau_absdeltaphi
 tau_calcVars_corrFTrk
 tau_calcVars_corrCentFrac
 tau_calcVars_EMFractionAtEMScale_moveE3
 tau_seedCalo_isolFrac
 tau_seedTrk_hadLeakEt
 tau_seedTrk_secMaxStripEtOverPt
 tau_TRHTOverLT_LeadTrk

- 9 or 8 input variables, 20 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- No trainings crashed.
- Still significant over-training.
- Action item: After discussing with SM, merge barrel inner and barrel outer in high pT bin. Restart with 10 input variables, 20 trees.

Input variable configuration	Sig eff for bkg @ 0.01
All 9 variables	0.846
Drop <code>absdeltaeta</code>	0.831
Drop <code>absdeltaphi</code>	0.836
Drop <code>corrFTrk</code>	0.810
Drop <code>corrCentFrac</code>	0.829
Drop <code>EMFraction</code>	0.813
Drop <code>isolFrac</code>	0.832

v06-00 (2012-12-01-17h07m32s)

Drop hadLeakEt	0.739
Drop secMaxStripEtOverPt	0.795
Drop TRHTOverLT	0.721

v05-01 (2012-12-01-16h08m50s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 10 or 9 input variables, 20 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- No trainings crashed.
- Still significant over-training.
- Action item: Remove `PSSFraction`, retrain in hope over-training is reduced with fewer input variables.

Input variable configuration	Sig eff for bkg @ 0.01
All 10 variables	0.844
Drop absdeltaeta	0.824
Drop absdeltaphi	0.836
Drop corrFTrk	0.805
Drop corrCentFrac	0.820
Drop EMFraction	0.825
Drop PSSFraction	0.846
Drop isolFrac	0.821
Drop hadLeakEt	0.742
Drop secMaxStripEtOverPt	0.799
Drop TRHTOverLT	0.734

v05-00 (2012-12-01-15h57m23s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 10 or 9 input variables, 40 trees.

v05-02 (2012-12-01-16h21m03s)

- Signal scores, background scores, and ROC curves [↗](#)
- First training for barrel inner, high pT category.
- No trainings crashed.
- Significant over-training.
- Action item: move to 20 trees, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 10 variables	0.857
Drop absdeltaeta	0.836
Drop absdeltaphi	0.843
Drop corrFTrk	0.809
Drop corrCentFrac	0.836
Drop EMFraction	0.832
Drop PSSFraction	0.849
Drop isolFrac	0.832
Drop hadLeakEt	0.749
Drop secMaxStripEtOverPt	0.811
Drop TRHTOverLT	0.734

v04-10 (2012-12-01-14h53m28s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 8 or 7 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- No trainings crashed.
- Over-training is in increased relative to 10 trees, but still not dramatic.
- Action item: Consult with SM. Move to next kinematic category.

Input variable configuration	Sig eff for bkg @ 0.01
All 8 variables	0.878
Drop absdeltaeta	0.842
Drop absdeltaphi	0.862
Drop corrFTrk	0.825
Drop corrCentFrac	0.860
Drop EMFraction	0.860
Drop hadLeakEt	0.826
Drop secMaxStripEtOverPt	0.824
Drop TRHTOverLT	0.731

v04-09 (2012-12-01-14h26m53s)

Show input variables Collapse input variables

v05-00 (2012-12-01-15h57m23s)

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 9 or 8 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- No trainings crashed.
- Over-training is in increased relative to 10 trees, but still not dramatic.
- Action item: remove `PSSFraction`, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 9 variables	0.883
Drop <code>absdeltaeta</code>	0.848
Drop <code>absdeltaphi</code>	0.870
Drop <code>corrFTrk</code>	0.838
Drop <code>corrCentFrac</code>	0.870
Drop <code>EMFraction</code>	0.873
Drop <code>PSSFraction</code>	0.878
Drop <code>hadLeakEt</code>	0.845
Drop <code>secMaxStripEtOverPt</code>	0.841
Drop <code>TRHTOverLT</code>	0.740

v04-08 (2012-12-01-13h48m46s)

Show input variables [Collapse input variables](#)

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 10 or 9 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- No trainings crashed.
- Over-training is in increased relative to 10 trees, but still not dramatic.
- Action item: remove `isolFrac`, retrain.

Input variable configuration	Sig eff for bkg @ 0.01
All 10 variables	0.886
Drop <code>absdeltaeta</code>	0.855
Drop <code>absdeltaphi</code>	0.873
Drop <code>corrFTrk</code>	0.841

Drop corrCentFrac	0.882
Drop EMFraction	0.875
Drop PSSFraction	0.882
Drop isolFrac	0.883
Drop hadLeakEt	0.894
Drop secMaxStripEtOverPt	0.845
Drop TRHTOverLT	0.752

v04-07 (2012-12-01-09h31m15s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 6 or 5 input variables, 80 trees.
- Signal scores, background scores, and ROC curves [?](#)
- No trainings crashed.
- Over-training is minor, in all configurations.
- Minor improvement by going to 80 trees. Feels like asymptotically approaching most optimal number of trees to train with.
- Action item: try 10 vars with 40 trees.

Input variable configuration	Sig eff for bkg @ 0.01
All 6 variables	0.851
Drop absdeltaeta	0.793
Drop corrFTrk	0.798
Drop EMFraction	0.820
Drop hadLeakEt	0.769
Drop secMaxStripEtOverPt	0.788
Drop TRHTOverLT	0.689

v04-06 (2012-12-01-09h09m14s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 6 or 5 input variables, 40 trees.
- Signal scores, background scores, and ROC curves [?](#)
- No trainings crashed.
- Over-training is minor, in all configurations.
- Some improvement by going to 40 trees, not as dramatic as going from 10-20.
- Action item: Increase number of trees from 40 to 80 to gauge affect.

Input variable configuration	Sig eff for bkg @ 0.01
------------------------------	------------------------

v04-08 (2012-12-01-13h48m46s)

All 6 variables	0.847
Drop absdeltaeta	0.789
Drop corrFTrk	0.792
Drop EMFraction	0.815
Drop hadLeakEt	0.765
Drop secMaxStripEtOverPt	0.785
Drop TRHTOverLT	0.685

v04-05 (2012-12-01-08h50m31s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 6 or 5 input variables, 20 trees.
- Signal scores, background scores, and ROC curves [?](#)
- No trainings crashed.
- Over-training is minor, in all configurations.
- Significant improvement by going to 20 trees.
- Action item: Increase number of trees from 20 to 40 to gauge affect.

Input variable configuration	Sig eff for bkg @ 0.01
All 6 variables	0.840
Drop absdeltaeta	0.781
Drop corrFTrk	0.786
Drop EMFraction	0.806
Drop hadLeakEt	0.754
Drop secMaxStripEtOverPt	0.778
Drop TRHTOverLT	0.681

v04-04 (2012-12-01-08h29m42s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 6 or 5 input variables, 10 trees.
- Signal scores, background scores, and ROC curves [?](#)
- **NB: Plots indicate v04-03 but they are v04-04.**
- No trainings crashed.
- Over-training is minor, in all configurations.
- No input variable is obvious candidate for removal. This could be a final set.
- Action item: Increase number of trees from 10 to 20 to gauge affect.

Input variable configuration	Sig eff for bkg @ 0.01
------------------------------	------------------------

v04-06 (2012-12-01-09h09m14s)

All 6 variables	0.816
Drop absdeltaeta	0.764
Drop corrFTrk	0.770
Drop EMFraction	0.785
Drop hadLeakEt	0.734
Drop secMaxStripEtOverPt	0.762
Drop TRHTOverLT	0.666

v04-03 (2012-12-01-08h11m40s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 7 or 6 input variables, 10 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- No trainings crashed.
- Over-training is minor, in all configurations.
- Action item: Remove "least valuable" variable (`corrCentFrac`) and do N-1 trainings with the remaining 6 input variables.

Input variable configuration	Sig eff for bkg @ 0.01
All 7 variables	0.837
Drop absdeltaeta	0.797
Drop corrFTrk	0.792
Drop corrCentFrac	0.816
Drop EMFraction	0.815
Drop hadLeakEt	0.775
Drop secMaxStripEtOverPt	0.783
Drop TRHTOverLT	0.689

v04-02 (2012-12-01-07h50m31s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 8 or 7 input variables, 10 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- One N-1 training crashed: training without `absdeltaeta`
- Over-training is minor, in all configurations.

- Action item: Remove "least valuable" variable (`absdeltaphi`) and do N-1 trainings with the remaining 7 input variables.

Input variable configuration	Sig eff for bkg @ 0.01
All 8 variables	0.851
Drop <code>absdeltaeta</code>	N/A
Drop <code>absdeltaphi</code>	0.837
Drop <code>corrFTrk</code>	0.801
Drop <code>corrCentFrac</code>	0.833
Drop <code>EMFraction</code>	0.835
Drop <code>hadLeakEt</code>	0.794
Drop <code>secMaxStripEtOverPt</code>	0.799
Drop <code>TRHTOverLT</code>	0.702

v04-01 (2012-12-01-07h17m38s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 9 or 8 input variables, 10 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- No trainings crashed.
- Over-training is minor, in all configurations.
- Action item: Remove "least valuable" variable (`PSSFraction`) and do N-1 trainings with the remaining 8 input variables.

Input variable configuration	Sig eff for bkg @ 0.01
All 9 variables	0.860
Drop <code>absdeltaeta</code>	0.822
Drop <code>absdeltaphi</code>	0.845
Drop <code>corrFTrk</code>	0.810
Drop <code>corrCentFrac</code>	0.844
Drop <code>EMFraction</code>	0.845
Drop <code>PSSFraction</code>	0.851
Drop <code>hadLeakEt</code>	0.815
Drop <code>secMaxStripEtOverPt</code>	0.818
Drop <code>TRHTOverLT</code>	0.711

v04-00 (2012-12-01-06h13m24s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_corrFTrk
```

v04-02 (2012-12-01-07h50m31s)


```
tau_calcVars_corrCentFrac
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEtOverPt
tau_TRHTOverLT_LeadTrk
```

- 10 or 9 input variables, 10 trees.
- Signal scores, background scores, and ROC curves [?](#)
- Two N-1 trainings crashed: training without `corrFTrk` and training without `secMaxStripEtOverPt`.
- Over-training is minor, in all configurations.
- TRHT ratio is super important, as expected.
- A number of variables qualify is "less valuable". See table below.
- Action item: Remove "least valuable" variable (`isolFrac`) and do N-1 trainings with the remaining 9 input variables.

Input variable configuration	Sig eff for bkg @ 0.01
All 10 variables	0.864
Drop <code>absdeltaeta</code>	0.832
Drop <code>absdeltaphi</code>	0.850
Drop <code>corrFTrk</code>	N/A
Drop <code>corrCentFrac</code>	0.858
Drop <code>EMFraction</code>	0.853
Drop <code>PSSFraction</code>	0.859
Drop <code>isolFrac</code>	0.860
Drop <code>hadLeakEt</code>	0.822
Drop <code>secMaxStripEtOverPt</code>	N/A
Drop <code>TRHTOverLT</code>	0.727

v02-06 (2012-11-30-04h47m20s)

Show input variables Collapse input variables

```
tau_calcVars_EMFractionAtEMScale_moveE3
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEt
tau_TRHTOverLT_LeadTrk
```

- 5 input variables, 10 trees.
- Signal scores, background scores, and ROC curves [?](#)
- No trainings crash.
- Performance of low pT bin improves without additional over-training. Good!
- Performance of high pT bin improves but with additional over-training. Bad.
- I am now suspicious of `secMaxStripEt` because I found out it is simply a raw energy, not energy / lead track pT or something like that.
- Action item: Discuss with SM.
- Action follow up: Discussed with SM, settled on 10 variables which should "in principle" be important for training. Will focus on those.

v02-05 (2012-11-30-04h36m22s)

Show input variables Collapse input variables

```
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEt
tau_TRHTOverLT_LeadTrk
```

- 4 input variables, 10 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- Low pT bin did not crash. This indicates this is at least partly correlated with available statistics.
- Over-training is reduced further, possibly to acceptable levels. I will now focus on improving performance, which has degraded since I reduced the list of input variables.
- Action item: Re-introduce EMFraction.

v02-04 (2012-11-30-04h19m59s)

Show input variables Collapse input variables

```
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEt
tau_TRHTOverLT_LeadTrk
```

- 4 input variables, 10 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- pT bin 30-60 GeV bin crashed. It appears there is a threshold between 50 and 20 trees for this configuration for crashing.
- Over-training is significantly reduced, and performance degradation is small. I will stick with 10 trees for now.
- Action item: Merge some pT bins to see if statistics boost helps.

v02-03 (2012-11-30-04h07m51s)

Show input variables Collapse input variables

```
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEt
tau_TRHTOverLT_LeadTrk
```

- 4 input variables, 50 trees.
- Signal scores, background scores, and ROC curves [↗](#)
- NB: The plots say **v02-02**, but these are **v02-03**. If in doubt, consult the date in the URL.
- pT bin 30-60 GeV did not crash here. Only change was increased number of trees. This behavior is not understood, but hopefully Noel's patches to taumva will help.
- Performance is only slightly improved, at the cost of more significant over-training.
- Action item: Go to 10 trees, keep 4 input variables.

v02-02 (2012-11-30-03h55m42s)

Show input variables Collapse input variables

```
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEt
```

tau_TRHTOverLT_LeadTrk

- 4 input variables, 20 trees.
- Signal scores, background scores, and ROC curves [?](#)
- pT bin 30-60 GeV crashed. Not clear why.
- Performance degradation (compared to 7 input variables) is significant.
- Over-training is reduced but still present.
- Action item: Go back to 50 trees, keep 4 input variables.

v02-01 (2012-11-29-13h34m54s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_EMFractionAtEMScale_moveE3
tau_etOverPtLeadTrk
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEt
tau_TRHTOverLT_LeadTrk
```

- 7 input variables, 20 trees.
- Signal scores, background scores, and ROC curves [?](#)
- Over-training is reduced but still present. Correlated with available statistics?
- Action item: Reduce number of input variables to see if this reduces over-training.

v02-00 (2012-11-29-13h05m27s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_calcVars_EMFractionAtEMScale_moveE3
tau_etOverPtLeadTrk
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEt
tau_TRHTOverLT_LeadTrk
```

- 7 input variables, 50 trees.
- Signal scores, background scores, and ROC curves [?](#)
- Over-training persists, especially in high pT bins.
- Action item: Reduce number of trees

v01-00 (2012-11-29-04h46m15s)

Show input variables Collapse input variables

```
tau_absdeltaeta
tau_absdeltaphi
tau_calcVars_ChPiEMEOverCaloEME
tau_calcVars_EMFractionAtEMScale_moveE3
tau_calcVars_PSSFraction
tau_etOverPtLeadTrk
tau_seedCalo_isolFrac
tau_seedTrk_hadLeakEt
tau_seedTrk_secMaxStripEt (not used at high eta)
tau_TRHTOverLT_LeadTrk (not used at high eta)
```

v02-02 (2012-11-30-03h55m42s)

- Signal scores, background scores, and ROC curves [↗](#)
- Variables expected to offer minor gains (redundant or not powerful) were removed.
- Two trainings did not converge: **pT 60--100 GeV, eta 2.00--3.00** and **pT 100+ GeV, eta 2.00--3.00**.
- Action item: Reduce variable list even further. Focus on specific kinematic region (inner barrel eta bin 0.00 - 0.80).

v00-00 (2012-11-28-08h22m31s)

Show input variables Collapse input variables

```
tau_absdeltaeta  
tau_absdeltaphi  
tau_calcVars_corrFTrk  
tau_calcVars_corrCentFrac  
tau_calcVars_ChPiEMEOverCaloEME  
tau_calcVars_EMFractionAtEMScale_moveE3  
tau_calcVars_pi0BDTPPrimaryScore  
tau_calcVars_PSSFraction  
tau_etOverPtLeadTrk  
tau_seedCalo_centFrac  
tau_seedCalo_hadRadius  
tau_seedCalo_isolFrac  
tau_seedTrk_secMaxStripEt (not used at high eta)  
tau_seedTrk_sumEMCelleEtOverLeadTrkPt  
tau_TRHTOverLT_LeadTrk (not used at high eta)
```

- First iteration
- Signal scores, background scores, and ROC curves [↗](#)
- All 15 variables considered in all regions, except `secMaxStripEt` and `TRHTOverLT_LeadTrk` were excluded at high eta because they are unstable/undefined here.
- A handful of trainings did not converge.
- Among converged trainings, over-training is observed everywhere.
- Action item: Reduce variable list significantly in hopes that that trainings will converge and over-training will be reduced. Re-introduce variables one-by-one to judge value.

Meetings

- 04 December 2012 @ Tau WG [↗](#)
- 27 November 2012 @ Tau WG [↗](#)
- 20 November 2012 @ Tau WG [↗](#)

Meetings (previous e-veto)

Indico search for "Harvey Maddocks" [↗](#)

- TauWG: 2012-07-17 [↗](#)
- TauWG: 2012-07-10 [↗](#)
- TauWG: 2012-06-12 [↗](#)
- TauWG: 2012-06-05 [↗](#)
- TauWG: 2012-05-22 [↗](#)
- TauWG: 2012-05-15 [↗](#)
- TauWG: 2012-05-02 [↗](#)
- TauWG: 2012-04-17 [↗](#)

Links

- [ElectronVetoTrain2012 SVN repository in penn/PennTau](#)

-- AlexanderTuna - 27-Nov-2012

This topic: Main > PennTauElectronVetoTrain2012

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