1 Move to ℓb classifier

1.1 Motivation

Move due to poor performance on event level BDT (was using 50% TRF and 50% testing/training). ST, minMax, HT and a few other variables performed better than the BDT → most likely due to the fact that the BDT score variable had half the MC than just taking the full MC dataset as normal.

1.2 Different Iterations/Setups

Common setup:

- use $t\bar{t}$ Bakoven sample (Ntuple-level selection of 1 lepton)
- Signal: ℓb from the same top
- Signal: ℓb **NOT** from the same top

1.2.1 Matching ℓ AND b to truth

Match ℓ and b to their truth particles, by use of smallest ΔR. Small ΔR is indication of a good match to truth.

- Signal: ℓ and b with the smallest ΔR (below some threshold → 0.3) and come from the same top
- Background: ℓ and b with the smallest ΔR (below some threshold → 0.3) and DON'T come from the same top

Note: threshold chosen of 0.3 is VERY loose

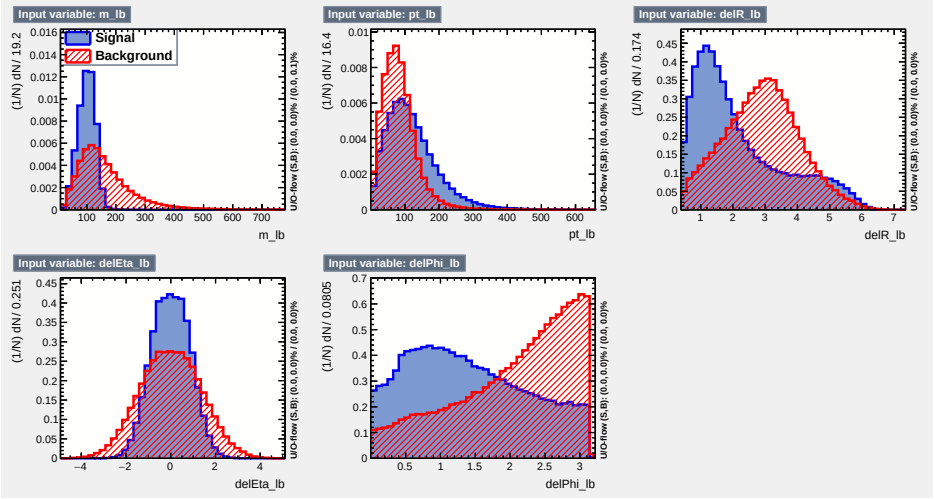
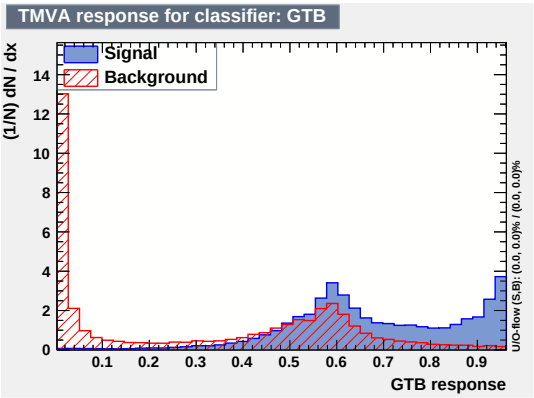


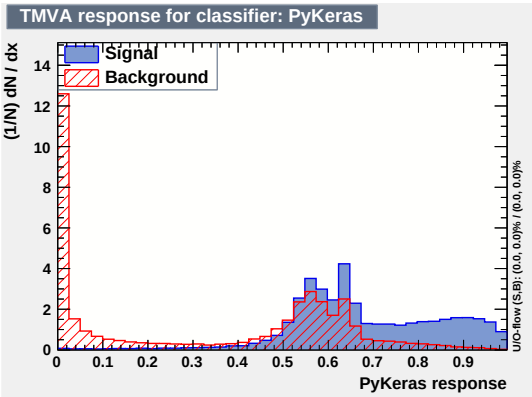
Figure 1: Input variables

- Num events[1] training ∼ 240 000 (sig and back)
- Num events testing ∼ 60 000 (sig and back)

⋆ Check non-linear correlation coefficient graphs (In TMVAGui)

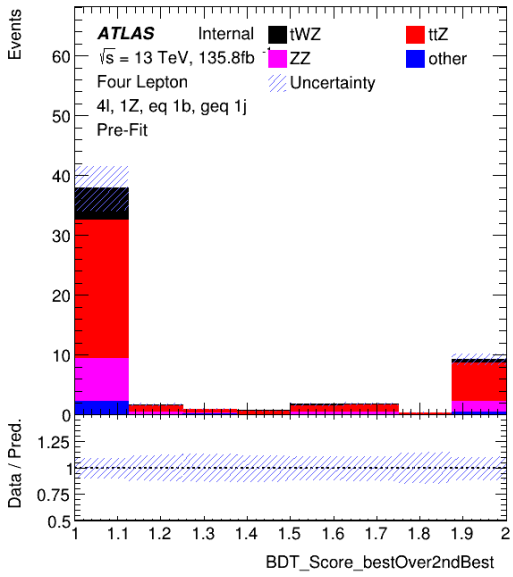
[0]Date: Early August 2020
[1]James says this is sufficient and any more would just slow down training

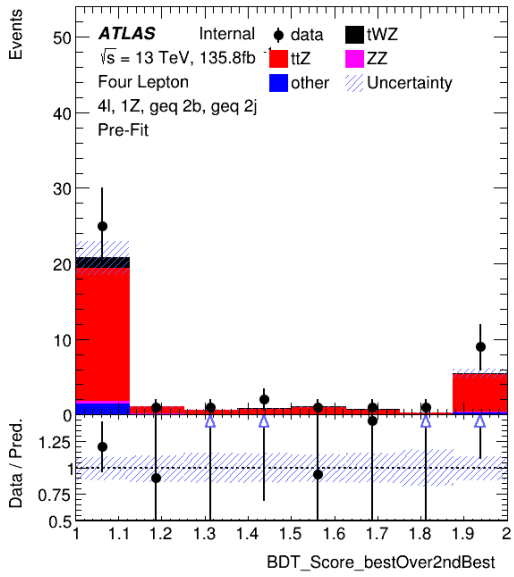




⋆ Weird bump?

Results:





Limit → 2.429 (All ASIMOV), 2.488 (Data in CR)

Previously (Full Run 2 $m(\ell b)_{minMax}$) → 2.474 (All ASIMOV), 2.535 (Data in CR)

1.2.2 Matching ℓb system to truth