

Qualification Task AFT-487

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Sample: group.perf-
idtracking.427080.Pythia8EvtGen_A14NNPDF23LO_flatpT_Zprime.e5362_e5984_s3126_r11212_IdealNomV5_EXT0

Jet Collection: AntiKt4EMPFlowJets

Track collections: InDetTrackParticle, InDetIdealTrackParticle

Jet-selection:

Jet $p_T > 20$ GeV,

Jet JVT > 0.5 (for jets with p_T in $[20, 60]$ GeV, $|\eta| < 2.4$),

OverlapRemoval ($e^\pm$, $\mu^\pm$), NOT isBad.

Jet-labeling:

b-c Hadr $p_T > 5$ GeV,

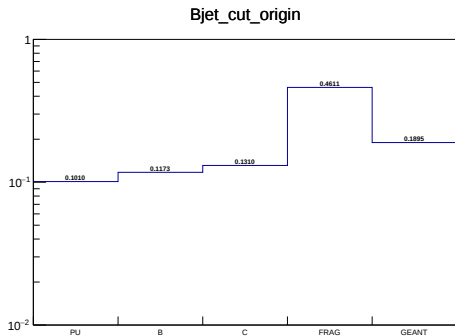
b-c Hadr $\Delta R < 0.3$.

No further track selection applied (no additional cuts on tracks).

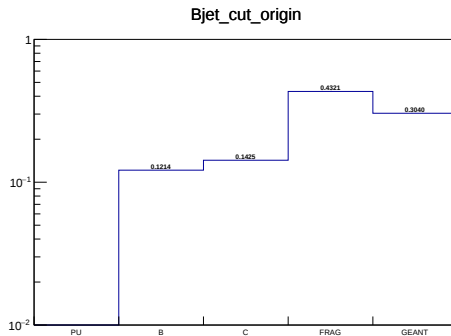
Each algorithm has its own track selection cuts.

b-jets origin composition

Track collection: InDetTrackParticle

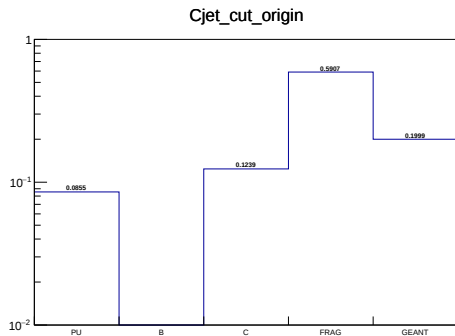


Track collection: InDetIdealTrackParticle

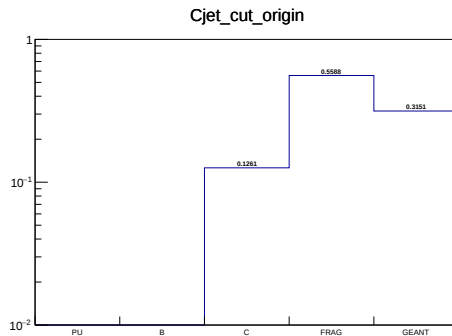


c-jets origin composition

Track collection: InDetTrackParticle

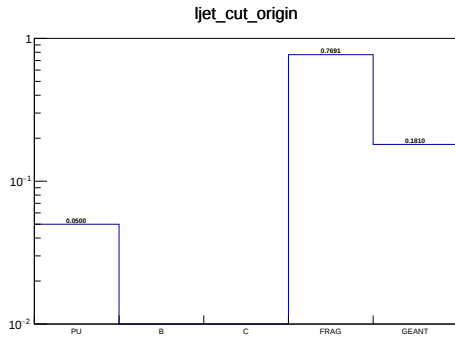


Track collection: InDetIdealTrackParticle

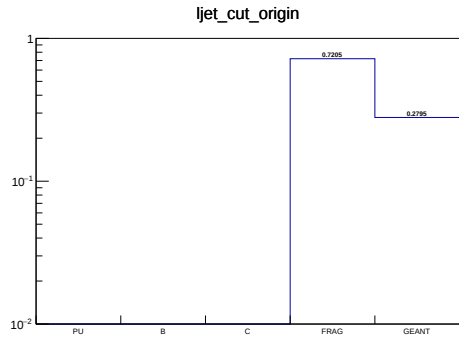


light-jets origin composition

Track collection: InDetTrackParticle



Track collection: InDetIdealTrackParticle



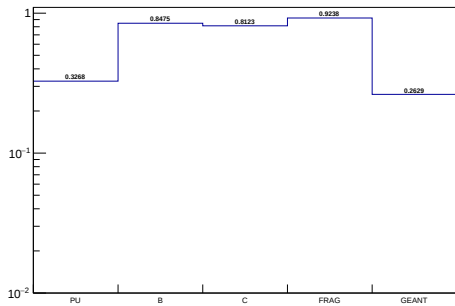
Taggers acceptance of tracks: ratio between the number of tracks selected by the given algorithm over the whole number of tracks - **only for b-jets** (for now).

We have IPxD track selection (which is in common to IP2D, IP3D and RNNIP), SV1 and JetFitter (SV0 seems to be missing from the sample).

The acceptance is plotted for each origin of tracks (PU, B, C, FRAG and GEANT).

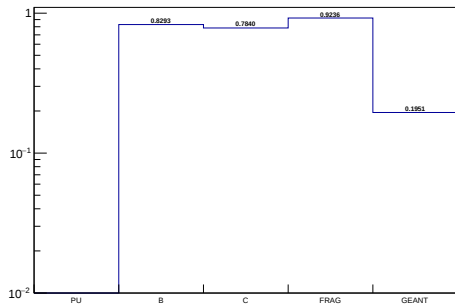
Track collection: InDetTrackParticle

trk_IP2D_origin_B/Bjet_cut_origin



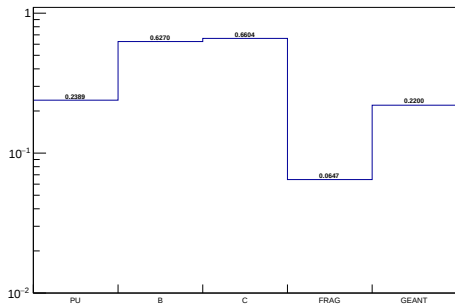
Track collection: InDetIdealTrackParticle

trk_IP2D_origin_B/Bjet_cut_origin



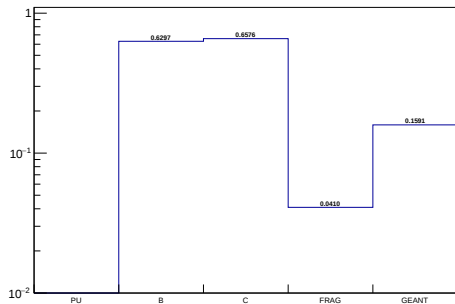
Track collection: InDetTrackParticle

trk_JF_origin_B/Bjet_cut_origin



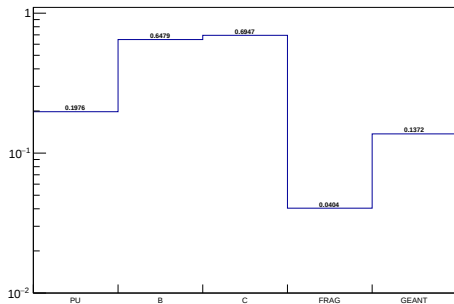
Track collection: InDetIdealTrackParticle

trk_JF_origin_B/Bjet_cut_origin



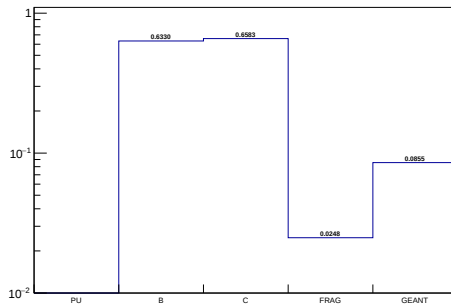
Track collection: InDetTrackParticle

trk_SV1_origin_B/Bjet_cut_origin



Track collection: InDetIdealTrackParticle

trk_SV1_origin_B/Bjet_cut_origin

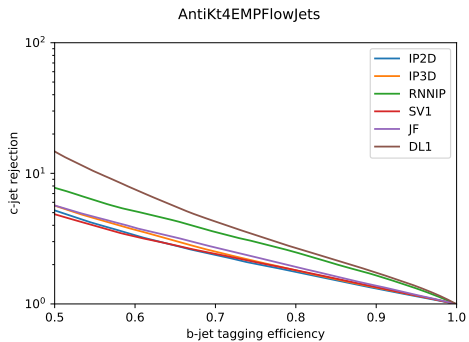


We see that IPxD acceptance of tracks coming PU is quite high (32%, a value higher than the one of other algos), and very high for FRAG (about 92%).

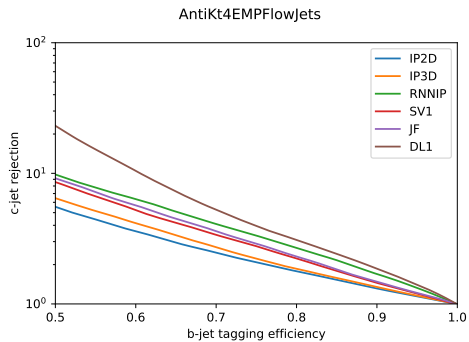
Interesting to see how the lack of PU coming from InDetIdealTrackParticle collection affects performances of algorithms.

ROCs - c-jet rejection

Track collection: InDetTrackParticle

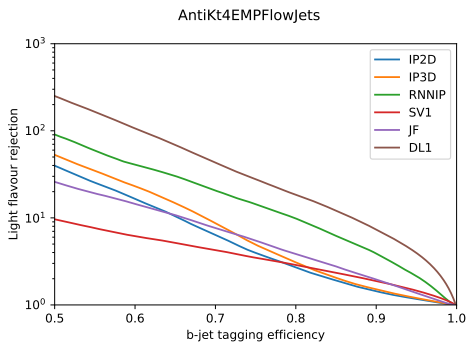


Track collection: InDetIdealTrackParticle

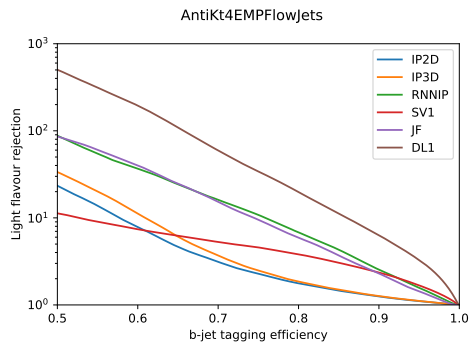


ROCs - Light flavour rejection

Track collection: InDetTrackParticle



Track collection: InDetIdealTrackParticle



SV1 seems to perform better on the Ideal tracks, together with JF.

IPxD algos (and DL1 too) do the opposite - they work better with the InDetTrackParticle collection, with PU in it.

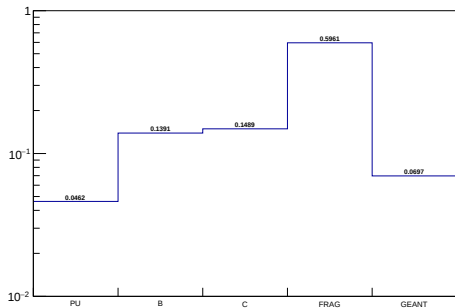
Next steps:

- 1 include the InDetPseudoTrackParticle collection and do a similar analysis,
- 2 try different cone shapes and sizes in the association process.

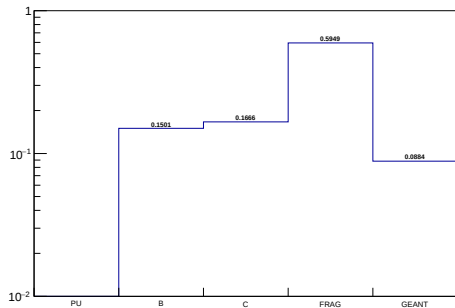
Other suggestions would be well accepted.

IPxD

Track collection: InDetTrackParticle

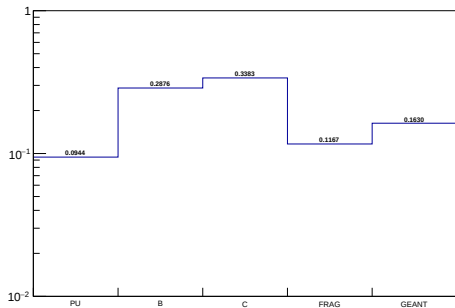


Track collection: InDetIdealTrackParticle

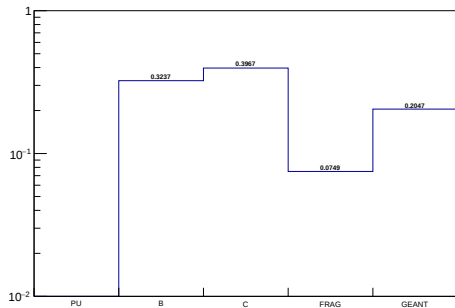


JF

Track collection: InDetTrackParticle

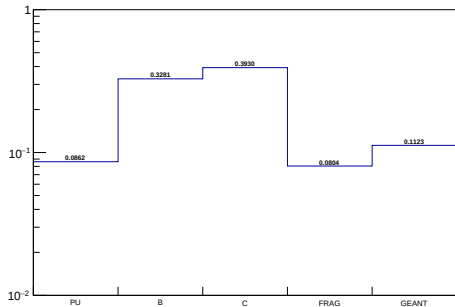


Track collection: InDetIdealTrackParticle



SV1

Track collection: InDetTrackParticle



Track collection: InDetIdealTrackParticle

