ACTS KF/CKF status

Xiaocong Ai

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KF smoothing

- Implementation of KF backward filtering (1725):
  - When forward filtering is done, reset propagation options, navigation&stepping state to filtered parameter at last measurement state

- Timing comparisons between smoothing with formalism and backward filtering
CKF status  (1710)

- Remove concept of children and sibling for MultiTrajectory
  - By keeping track of those ‘active’ track entry indices instead
- Avoid storage duplication for possible:
  - Predicted parameter and uncalibrated measurement
  - Filtered parameter for non-measurement state (i.e. outlier, hole, passive-material)
- Implement smoothing (using formalism) after forward filtering
- Implement source link selector
  - Input: predicted parameter and source links
  - Return: either compatible source links (i.e. using detector-dependent criteria) as measurements or source link with min chisq as outlier
- Implement void branch stopper during filtering
  - Input: multiTrajectory and entry index
  - Return: false (whether to stop this branch)
Mean number of states on track

100 events with 1k pt= 10Gev/c muon tracks per event
Tracking efficiency and fake rate

- Reco-truth matching criteria: \( \frac{N_{\text{majority hits}}}{N_{\text{total hits}}} \geq 0.8 \)
- Track finding efficiency is defined as: \( \frac{N_{\text{truth-matched reco track}}}{N_{\text{truth track}}} \)
- Fake rate is defined as: \( \frac{N_{\text{truth-unmatched reco track}}}{N_{\text{reco track}}} \)
CKF timing test

1 event
➔ pt = 10 GeV/c
➔ eta = [-1, 1]
➔ No B field

Track finding time/event

Track finding time/track/event
Next to do

• KF
  – Get backward filtering merged
  – Get outlier rejection merged
  – Rebase outlier/hole emulation
  – Implement mis-calibration emulation

• CKF
  – Test with more realistic detector geometry
  – Speed-up with fast navigation
Tracking efficiency and fake rate

10 events with 5k muon tracks per event

Tracking efficiency

Tracking fake rate