

ID Reconstruction



- Reminder of What We Have or Plan to Have
 - Track Finding
 - Track Extrapolation
 - Track Fitting
- Current Status

Track Finding (I)



- Wealth of algorithms available
 - General purposes
(iPatrec(C++), xKalman/xKalman++)
 - More specialized: Pixlrec, ASTRA, Xhourec
 - LVL2 algorithms (SCT-Kalman...) shall be run in offline framework

Track Finding (ii)



- Algorithms are sometimes quite different
- but using same utilities rewritten n times
 - convergence on utilities
 - convergence on algorithms not desirable
 - new algorithms (or improvement to existing one) needed for:
 - non-pointing tracks
 - very low p_T tracks (<0.5 GeV)

Track Extrapolation



- = extrapolating track parameters and (possibly) covariance matrix from a point to a piece of the detector, taking into account non-homogeneous magnetic field, energy loss, in a minimum amount of time
- well defined, but difficult task
- convergence on one or two tools

Track Fitting



- Two classes of algorithms exist: Kalman filter/smoothen and numerical χ^2 fit
- Convergence on two algorithms should be possible but careful with couplings to track finding methods

Track class



- A merging of iPatrec and xKalman classes is possible (at least) for output classes
- Involves also the way the clusters are stored
- The design has to take into account downstream users (e.g. e ID, vertexing)
- A very simple class (parallel to combined ntuple block) will first be used to allow filling of combined ntuple from Athena

ID reconstruction: update



- Code evolution
- New geometries
- Migration to Athena

Overall Reconstruction plan



- Main milestones:
 - Xmas 2000: all Atrecon functionalities in the new framework (Athena), reading Digits through the Event interface.
 - =>in practice the code should be ready by mid-November 2000!
 - Xmas 2001: same functionalities but with full use of new features (GEANT4, databases, detector description) and merging of algorithm common features

New Geometry



- Close to final geometry:
 - Pixel: layers and cylinders displaced, pixels of different size, dzdr
 - SCT: small changes
 - TRT: modular geometry
 - Magnetic field: solenoidal
- These non trivial changes are or are being accommodated by iPatrec and xKalman++
- Testing first in Atrecon then in Athena

iPatrec evolution



- Progress towards modularization (separate iPatrec and MUID)
 - cleaning of ipatrec track class
 - TRTREC used again
 - preparation of sets of Hits container classes (UCL group)
 - a separate module for seeds handling
 - some cleaning is still needed (remove some remaining Fortran)
 - running on full ID will be possible

...iPatrec evolution



- Need to be adapted to new geometries (still being able to reconstruct TDR data)
- no real problem but easiest way is to have Event (the C++ interface to digits) hide this change
- => will use Event also when running in Atrecon
- clustering in Event to be fully validated

xKalman evolution



- xKalman++ runs in Atrecon and has been interfaced to Athena
- xKalman++ is being updated to take into account new geometries
- xKalman Fortran is frozen
- xKalman++ perf has not been studied
 - usual strategy (TRT histogramming + Kalman filter-smoother)
 - new strategies (PIXL+SCT histogramming)

...xKalman evolution



- xHourec (“late” track reconstruction, needed for photon reconstruction, and maybe K0s) diverged from xKalman
- xHourec++ should be based on xKalman++

Other ID items



- Pixlrec
- Vertexing, kinematic fitting (CDF Fortran package use so far)
- conversion/K0s/primary vertex/hadronic interactions
- brem fitting strategies
- e/K/ π separation
- visualization

Conclusion



- Migration to Athena on track (iPatrec and xKalman should be there in September)
- Backward compatible use of new geometry
- Lots of testing is needed
- People also needed to work on combined



Raw data

Calibrations

Clustering

Bad Channels

Roads

Geometry (hits)

Track finding

Track

Track fitting

Magnetic field

Track extrapolating

Geometry (material)