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RecPack, a general reconstruction toolkit

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RecPack is a general reconstruction toolkit, which can be used as a base for any reconstruction program for a HEP detector. Its main functionalities are track finding, fitting, propagation and matching. Track fitting can be done either via conventional least squares methods or Kalman Filter techniques. The last, in conjunction with the matching package, allows simultaneous track finding and fitting. The navigation package permits the propagation of the fitted trajectories to any surface within the detector, taking into account effects such as multiple scattering, energy loss and inhomogeneous magnetic fields. In addition, a simple simulation package for debugging of reconstruction algorithms is provided.

All the algorithms of RecPack are independent of the setup, which makes the toolkit completely general. The geometry package has all necessary methods to build complicated detectors from simple individual blocks: box, tube, sphere, rectangle, ring, etc. In addition, any new propagation model, measurement type, volume type, etc, can be added to the system very easily.

RecPack was born in the HARP experiment, at CERN, but it is used at the moment by other experiments: MICE, MuScat, K2K, T2K and LHCB (trigger studies).

Several developments are going on: generalization of pattern recognition algorithms, GUI for visualization of reconstruction processes step-by-step, etc.

Summary

The first part of the talk explains why general reconstruction packages are extremely useful for the HEP community. Some examples are given and a comparison with general simulation and analysis packages is made. The second part of the talk is devoted to RecPack. The main functionalities of the package are presented first, giving some details on how to use them. Then, the package is presented from the software point of view: hierarchy of data classes and machines, main dependencies, etc. Finally some examples are given, and the future developments of the package are presented.

Primary authors: Dr CERVERA VILLANUEVA, Anselmo (University of Geneva); Prof. HERNANDO MORATA, Jose Angel (CERN); Prof. GOMEZ CADENAS, Juan Jose (University of Valencia (Spain))

Presenter: Dr CERVERA VILLANUEVA, Anselmo (University of Geneva)

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