Cuts software

CM50

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Intro

- Update cuts framework that Misha had implemented.

- Formal motivation for this written in the Cuts Upgrade Specification document by Chris Rogers.
  - Expand data stored in the ReconEvent.
  - Allow other users to easily add their own cuts.

- Thanks to Chris Rogers and Chris Hunt for useful discussions.

- Decided to implement a new mapper MapCppReconCuts and data structure instead of modifying the existing one.
  - Can have both Misha's cuts and the new structure in parallel.

Overview of changes

- New mapper map/MapCppReconCuts
  - MapCppReconCuts
    - Main mapper class, i.e. contains _birth, _process and _death methods.
    - Specifies what cuts are defined and creates a vector of cuts.
    - Reads configuration from nested dictionaries and sets parameters.
      - recon_cuts={"ReconTOFCuts":{"min":28,"max":32}, … }
  - MapCppReconCutBase
    - Base class
  - MapCppReconXYZCut
    - Derived class that defines DoCut()
    - Creates objects to store cut data and adds to ReconEvent.
- Plan to group similar cuts into the same class. Should make execution more efficient.

Overview of changes

- Changes to data structure
  - Added ReconCutBase
    - Base class defines what information is stored.
    - Name
    - Description, e.g. "TOF0SpacePoints==1"
    - pass
    - Parameter value
    - Option to derive from this to store more info if needed.
  - Modified ReconEvent
    - Typedef std::vector<ReconCutBase*> ReconCutBasePArray
    - ReconCutBasePArray _cuts_list
    - Deletes _cuts_list and contents.

Current Status and plans

- Implemented mapper and data structure changes.
- Implemented TOF cuts from Misha.
  - Testing execution.
- Straight-forward to implement new cuts by copying what has been done for the TOF.
  - Add new class in MapCppReconCuts module.
  - Define cut in DoCut method and create ReconCutBase object and add to ReconEvent.
- Next steps
  - Complete testing.
  - Implement the other cuts done by Misha.
  - Add new cuts/help other people to add cuts.
  - Cuts to be used currently hard-coded in the mapper ReconCuts.
    - Think about changing this.