Trace-Reco

Requirements

The enviroment must be set up according to the guide

Reconstruction: building the code

The source code for the trace reconstruction application is available in baltig

These are the steps required for building and install the application locally:

```
mkdir $HOME/Software
cd $HOME/Software
git clone https://baltig.infn.it/muontomography/trace-reco.git PattRec
cd PattRec
mkdir build
cd build
cmake3 -DCMAKE_INSTALL_PREFIX=$HOME/Software/PattRec -DCMAKE_BUILD_TYPE=RelWithDebInfo -DBOOST_INCLUDEDIR=/usr
/include/boost169/ -DBOOST_LIBRARYDIR=/usr/lib64/boost169/ ..
make
make install
cd $HOME/Software/PattRec
ln -s bin/runPR .
```

Reconstruction: running the application

Assumed that the dataset files:

- are stored in the directory $HOME/Data
- have an extension **.i<serial number>**

The track reconstruction can be run with the following command:

```
./runPR --conf=$HOME/Software/PattRec/chamber0.ini --dataset=$HOME/Data/<dataset name without extension> --
maxevn=1000000
```

The executable produces a set of data files in the **OUTPUT** directory, the dataset name (without the extension) is used as a prefix for the output files. The option **conf** specifies the full name of a configuration file; an example of configuration file, with documented items, is the file **mutomca_pr.ini**, located in the working directory:

```
# directory for output files
outdir = ./OUTPUT
# minimum number of hits per super-layer for pattern reconstruction
min_nhit_theta = 4
# maximum number of hits per super-layer for pattern reconstruction
max_nhit_theta = 8
# number of event to be processed (default 100000000) if not specified in the command line
maxevn = 100000000

# dataset path (withou extension .i*) if not specified in the command line
#dataset=/mnt/muotom-data/data/castor/altea/rawdata/3_V_100_TrgAndPhi_5hits-4layers_mask_2404_3316_43

# tubes to be excluded from the pattern reconstruction (space-separated list of <layerid>,<tubeid>)
#bad_tubes = 0,12 1,32 2,9

# mean timer threshold for condition mta-mtb (default 15.0)
mtimer_threshold_first = 15.0
# mean timer threshold for other conditions (default 20.0)
mtimer_threshold_second = 20.0

# max time of a time box in ns
time_box_size = 400
```

The command line options **dataset** and **maxevn** are not mandatory, they can be defined in the configuration file. If they are specified both in command line and in the configuration file, the command line values get priority.