

Transverse momentum spectra

This is the analysis used in `examples/exp13.optns` (proton-proton scattering).

```
!-----
!                               Define analysis
!-----

write "Our first histogram"      !the "write" writes litterally to the output file

beginanalysis
  histogram
    pt      !variable name (x-axis)      (The pt variable refers to "transverse momentum")
    numptl !what is counted (yaxis)      (The numptl variable refers to "number of particles")
    12      !normalisation (see below)
    0       !xmin  (range for
    20      !xmax   x variable)
    100     !number of bins
  trigger iptl A+B+1 inf !do not consider spectators
                        !(the iptl variable refers to the particle index in the particle list)
  trigger rap -1 1      !rapidity range  (The rap variable refers to "rapidity")
  set hisfac 0.5         !overall normalization factor
  idcode 120 idcode -120 !define particle species (see EPOS id codes)    (+-120 are pions)
  noweak                !no weak decays
endanalysis

!-----
!       Write out final results to output file
!-----

histoweight          !provides event weight
writearray 3         !provides histogram table (x,y,y-error)
```

The command **write** defines the histogram title (here: **Our first histogram**). It does not matter if this is put before or after the analysis part.

Defining analysis

The commands between **beginanalysis** and **endanalysis** define our analysis.

We first define the *xvariable* as **pt** (transverse momentum) and *yvariable* as **numptl** (number of particles). The following four numbers define: the normalisation code (**12** means that we perform a normalisation by dividing by the number of events and by the bin width), the transverse momentum range (from **0** to **20**), the number of bins (**100**).

The first trigger concerns the special variable **iptl**, which is the index of the particle in the particle list. The trigger limits “A+B+1” and “inf” are special values, which allows to not consider the places with projectile and target spectators. The second trigger restricts particle counting to the rapidity range [-1, 1].

A normalisation factor of 0.5 is used, with help of **hisfac**.

The **idcode** commands define the particles of interest. Please refer to **src/KWt/idt.dt** to get EPOS identifier values. In this example, we only focus on charged pions (π^+ , π^-).

Finally, we do not consider weak decays (**noweak**).

Output

The command **histoweight** prints the histoweight value, in this case the number of triggered events. The command **writearray 3** creates a 3-column table with X, Y and Y-error values. The analysis results are written in the file **\$(HTO)z-exp13.histo**.

We get 100 bins with rapidity values in the range [0, 20] with a total of 200 events. One can then build and display the plot.

