

SurfaceChecker (geometry/solids/test)

There are two ways to use the SurfaceChecker, a manual step by step procedure and a automatic version by calling a script named testall.pl.

Manual use of SurfaceChecker:

1) `SurfaceChecker run1.mac > data/yourfile.data`

Comments:

- in run1.mac: select your detector (Box, Torus, Cons, Sphere, Orb, TwistedTrap..)
- run1.mac can be replaced by some longer tests,e.g. runLong.mac
- runspecial.mac is used to save the random number at the end of a given event. Restart with runSingle.mac at the previous random number position. This is useful for debugging.
- You have to redirect the output to a file in the directory "data", with the filename extension ".data", see next step.

2) `extract.pl`

This perl script parses the output file (located in the "data" directory) and converts the information into a ntuple. The file will have the same name as your data file (e.g. yourfile.hbk) and will be stored in the directory "hbk". (Maybe you need to create this directory). The format of the ntuple (with Id 1) is the following:

u,v : general surface parameters
x,y,z: generated (true) surface point in Cartesian coordinates
px,py,pz: vertex position in Cartesian coordinates
dist: (true) distance between vertex and intersection
vx,vy,vz: momentum of particle at vertex
rx,ry,rz: reconstructed intersection
delta : distance between reconstructed and true intersection
theta: angle between momentum and surface normal at intersection
(not implemented yet for all solids).

All length units are in mm.

3) Start paw and open the hbook file (e.g: hi/file 1 yourfile.hbk)

- To produce a 3D plot of the intersection points and superimposed bad events:
nt/pl 1.x%y%z
nt/pl 1.rx%ry%rz delta>0.1 option=s
- To produce a distribution of the distance between true and reconstructed intersection
point
nt/pl 1.delta

A more sophisticated way to plot this distribution is by using the existing kumac singlesolid.kumac:

```
exec singlesolid yourfile.hbk
```

This produces two postscript files (yourfile-full.ps and yourfile-zoom.ps) containing the error distribution at a full range (10^{-12} to 10^5 mm)

Automatic use of SurfaceChecker:

- 1) Edit testall.pl by specifying
 - o which solids do you want (give a list of solids or a single solid)
 - o How many events do yo want to process (default is 100000)
- 2) Run testall.pl

This script is then running SurfaceChecker for all solids you specified, and converts the data files by using extract.pl to hbook files. The hbook files are located in the directory 'hbk' and are named

run_Solidname_NumberOfEvents.hbk (e.g. run_sphere_100000.hbk)

After finishing all solids the script executes the paw macro solid.kumac which produces two plots (solid-full.ps and solid-zoom.ps) which are similar to the plot produced by singlesolid.kumac. The only difference is that this plot contains the result of all solids you specified in testall.pl, and by this giving a nice comparison between different solids.

Examples of solid-zoom.ps and solid-full.ps



