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Subject: Re: GEANE extrpolate to point of closest approach

Posted by [Lia Lavezzi](#) on Fri, 11 Apr 2008 08:55:46 GMT

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Hi Christian,

I tried to set up an example to better explain the propagation to the point of closest approach. I attach to this message the tar file `geanepca.tar.gz` which contains the directory `geanepca`. This directory contains the task `CbmGeaneTrC` which performs an example of propagation to point of closest approach to a point, the macro to run the simulation `runMC.C` and to run `GEANE` `rungeane.C`.

This example uses the same planes as in `tutorial/ex1` (an array of planes perpendicular to the x axis), so you must set up the same environment, i.e.:

- 1) copy the geometry file `plane3.geo` to the geometry directory
- 2) add the plane directory (in which the plane is defined as a detector) to general `CMakeLists.txt`
- 3) add the `geanepca` to the list too.

This should allow you to run this example.

To do this you simply can run the `runMC.C` macro, which simulates 1000 muons from vertex (0,0,0) with momentum (1,0.01,0.01) (this is only to simplify things, but can be generalized). Then you can directly run the `rungeane.C` macro, which performs the propagation to the point of closest approach to a chosen point on the plane.

The plane is set at 135 cm from the origin in the x direction, perpendicular to it. The point is chosen after having a look to the montecarlo points: if you open the output file of `runMC.C` you will see that the `fX` coordinate is 135, while the `fY` and `fZ` are smeared (due to the magnetic field) around 72 and 2 cm (this is why I chose these values to set the space point with respect to which calculate the closest approach). You can try with other values and modify the task in order to have a more realistic case.

The key part of the task is in these lines:

```
// ----- propagation: I use propagate to closest -----  
TVector3 v0 = TVector3(135, 72, 2);  
fPro->SetPoint(v0);  
TVector3 wire1 = TVector3(0, 0, 0);  
TVector3 wire2 = TVector3(0, 0, 0);  
fPro->SetWire(wire1, wire2);  
fPro->PropagateToPCA(1); // 1 if point; 2 if wire  
Bool_t rc = fPro->Propagate(fStart, fRes, PDGCode);
```

- `v0` is the space point with respect to which you want to calculate the point of closest approach and then extrapolate the track

- `fPro->SetPoint(v0);` tells this to `GEANE`

- `TVector3 wire1 = TVector3(0, 0, 0);`

`TVector3 wire2 = TVector3(0, 0, 0);`

`fPro->SetWire(wire1, wire2);`

these lines can also be avoided since you want the point of closest approach to a point and not to a wire.

- `fPro->PropagateToPCA(1);` // 1 if point; 2 if wire

tells `GEANE` you want to propagate to the PCA to a point and not to a wire

- `Bool_t rc = fPro->Propagate(fStart, fRes, PDGCode);`

performs the actual propagation: it extrapolates the track to a very high track length and stops when the point of closest approach to your defined space point has been found.

I hope this can be useful, if something does not work, please tell me, also because I set up this example in a short time, so maybe I lost something (let' s hope I did not )

Pay attention to one point:

two propagation to the point of closest approach are set up in GEANE: PCA to a space point and to a wire: the first one uses the CbmTrackParH representation and works in the SC frame; the second one uses the CbmTrackParP representation and works in the SD one.

Ciao,  
Lia.

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### File Attachments

1) [geanepca.tar.gz](#), downloaded 471 times

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