

MAUS - Feature #699

MC truth - Reconstructed track parameters

12 September 2011 19:01 - Blot, Summer

Status:	Rejected	Start date:	12 September 2011
Priority:	Normal	Due date:	
Assignee:	Rogers, Chris	% Done:	0%
Category:	Tracker	Estimated time:	0.00 hour
Target version:	Future MAUS release		
Workflow:			
Description			
From MC true momentum values and a magnetic field value, one should be able to calculate the radius of a helix as $pt = R * B * 0.3$			
When I look at MC true momentum values, and the magnetic field value of 4T, as it should be in the simulation, I get radii that are approximately 10 mm larger than the radii I get from fitting a circle to 3 spacepoints in the x-y plane. I am using the same method as was in G4MICE (matrix determinants), double checked against book sources. I've attached a histogram for you to see the residual for $R_MC - r_recon$			
I'm using MC px and py at doublet layer 0, from station 5, of tracker 0 and $B = 4T$ to calculate R_MC . I reconstruct a circle in the x-y plane using spacespoints from stations 1, 3, and 5 in tracker 0, and find the radius of this circle. And then I do $MC R - r_recon$. There are a few outliers in the plot. I will be thoroughly checking this out, but at a glance they seem to be from cases where there is either more than one spacepoint to choose from per station, or where the MC true momenta don't look appropriate (i.e. large increase in MC pt from tracker 0 > tracker 1, or large decrease in MC pz from tracker 0 > tracker 1.) I've included a log-ish type of file that contains all of the residuals where MC- Recon is < 0. Can't include the entire input file because it is too large.			
I don't know whether its the matrix calculations, bug in my code (also unlikely since its basically the first thing I do) OR if there is something awry in the simulation.			
It should be noted that all other track parameters will depend on the radius, so if this is calculated wrong, there is no hope for the rest.			

History

#1 - 13 September 2011 12:02 - Blot, Summer

- File 8Telsa.gif added

Note that the reconstructed radius is found independently of the magnetic field value, but finding the radius from MC truth involves using the magnetic field value in the equation $pt = r*B*0.3$

in /maus/src/legacy/FILES/Modules/Tracker

TrackerSolenoid0.dat and TrackerSolenoid1.dat, it says that the field is 4T, so that is what I used to calculate R_mc .

If instead I assume $B = 8T$, I get much better agreement, which is why I am led to believe that it is possibly something wrong with the magnetic field value/simulation, not my code...

(I attach another histogram showing you the better agreement for $R_MC - r_recon$) The outlying points are due to events where there are 2 spacepoints in each station, and so the wrong combinations of these will give bad agreement with MC.)

#2 - 16 March 2012 17:20 - Rogers, Chris

- Status changed from Open to Rejected

No longer relevant I think - reopen if not

Files

R_mc_r_recon.gif	14.7 KB	12 September 2011	Blot, Summer
check_points.txt	25.5 KB	12 September 2011	Blot, Summer
8Telsa.gif	14.4 KB	13 September 2011	Blot, Summer