Subject: ROOT based track follower discussion.
Posted by Lia Lavezzi on Fri, 29 Oct 2010 08:41:08 GMT
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Hi all,
   we would like to start a discussion on the proposal to build up a new track follower, ROOT based.
The original idea comes from Mohammad so we would ask him to please correct what we are going to say if it is not precise.

For those who are not aware of the discussion, here is a short summary.
Before the summer holidays we (Pavia group) proposed to Mohammad and others VMC people to insert Gean4e (the same as GEANE, but Geant4 based) in the VMC, in order to test it and compare it to GEANE. This necessity comes from the fact that GEANE is written in fortran and this creates the need of a continuous and not easy maintainance. Mohammad proposed to write a new ROOT based track follower instead: it would be completely independent from the transport engine.
We think that this is a very good idea, it would make it easy to maintain, easy to use and it would allow also other experiments (basically all the ones which use ROOT) to use it if they want.
In that case the propagation of the particles in the magnetic field would make use of the Runge Kutta algorithm. This is already available in fairroot and also in ROOT.
Since the genfit people just worked on the RKTrackRep, we thought that they may also be interested in this project and, from a short exchange of emails with them, it seems so.

Since many people have a good feeling about this project, it may be useful to be more concrete and to define what exactly we already have and what is still missing, so that everyone can contribute and we can enlarge the discussion. Maybe we should also re-start the discussion with the VMC people.

Could those people interested in this project please reply to this message and comment? Depending on the number of persons interested we could start planning this new activity.

        Best regards,
   Lia, Alberto and Gianluigi.

Subject: Re: ROOT based track follower discussion.
Posted by Anonymous Poster on Fri, 19 Nov 2010 22:39:47 GMT
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Dear colleagues,

sorry for replying so late. The message had slipped by my attention, but now it came back.

I think that the development of ROOT track follower including material effects on the same level of quality as GEANE would be a great thing for the HEP community.
I indeed think that the Runge-Kutta implementation of RKTrackRep would be a great starting point. We of course did not invent this ourselves, but it was ported via several intermediate

steps from Rene Brun's original implementation in GEANT3. The nice thing about it is the following: It internally uses a 7-dimensional coordinate system, defining the track just by (x,y,z,ax,ay,az,q/p) where the vector (ax,ay,az) is a unit vector in momentum direction. In this system there are no numerical poles. Extrapolations in all directions are possible without any trouble.

I do believe that the material treatment in RKTrackRep is not yet of the same quality as GEANE, and we frankly lack the manpower to push it further at the moment. It would be great if the Runge-Kutta core of RKTrackRep could come together with the material treatment ported from GEANE to become a ROOT class.

I would love to make a GENFIT track representation class based on that. It would be welcomed by many people, I'm sure.

I can offer help in understanding the RK code and am always open to discuss implementation details about this new class(es).

Cheers, Christian