Subject: Tracking uncertainties
Posted by Ralf Kliemt on Thu, 11 Jul 2013 14:07:23 GMT
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Hi Lia, Gianluigi and tracking experts.

On the last Panda meeting I talked with Gianluigi about the issue of too low chisquare values in particle fitting. We agreed on the strategy to plot differences to mote-carlo, pull distributions and the uncertainty distributions.

You'll find attached a pdf with such distributions from 10k Psi(3770) -> J/Psi pi+ pi -> e+ e- pi+ pi- events.

First page is the fourmomentum. Here only the energy pulls are a bit wide. Second page has the position variable. Residuals look OK but the pulls are too small.

So I went some steps back and check the first track Parameters.
This is a bit tricky as I need to get the MC truth propagated to the actual region of the first parameter. I did so with Geane and PropagateToPlane. As Plane I use the same plane as it is stored in the reconstructed parameter.

The last row on the second page and the third page show these distributions. However, everything looks aweful.
I guess I made a mistake somewhere.

I put an update to svn and also the macro I use to create these plots. You may use any of your own simulations as it only needs measured charged particles and the mc truth.

Hope to find answers.
Ralf

File Attachments

1) testParticles-print-params.pdf, downloaded 643 times
2) testParticles.C, downloaded 723 times

Subject: Re: Tracking uncertainties
Posted by StefanoSpataro on Thu, 11 Jul 2013 15:28:15 GMT
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Hi Ralf,
few technical comments from my side.
First, you choose not the perfect channel, since you produce electrons which undergo to bremmstrahlung, and their tails are not gaussian. I would suggest to analyse the channel with J/psi->mu+mu-, to avoid such problems.

Second, as coordinates and momentum of the first params, I would suggest to do something different: you could take the first hit, from the hit you go to the point, and from the point you retrieve the montearlo position and momentum. You can take a look into macro/pid/check_trackcand.C to see what I) did some time ago to explore the coordinates of all the hits, but you need tot ake only the first hit. In this way you avoid the geane sistematics.

Third, i would suggest to selct only candidates with fitted track parameters (GetFitStatus()>0), and to be sure that they are coming from the same detector, i.e. the first hit should be on the mvd pixel. if not, your resolution plots could be the sum of different detectors with different errors, and a bit misleading. I would separate also barrel tracks from forward tracks.

Hope it helps somehow. I did not check your code or plots yet.

Subject: Re: Tracking uncertainties
Posted by Ralf Kliemt on Fri, 12 Jul 2013 07:28:35 GMT
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Hi Stefano,

Do we have the "first" hit, where the firstPar is defined, available? I.e. do we store the index of it to the reco objects?

Ralf

Subject: Re: Tracking uncertainties
Posted by StefanoSpataro on Fri, 12 Jul 2013 07:40:05 GMT
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The PndTrack has inside the PndTrackCand, which contains PndTrackCandHit, the full list of detector Ids and detector Ids. If you take the sorted array, you can retrieve esaily the first and the last hit. Just check the macro/pid/check_trackcand.C macro.

Subject: Re: Tracking uncertainties
Posted by Ralf Kliemt on Fri, 12 Jul 2013 07:55:31 GMT
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But how sure are you that it coincedes with the hit used to get the firstPar?

Ralf

Subject: Re: Tracking uncertainties
Posted by StefanoSpataro on Fri, 12 Jul 2013 07:57:49 GMT
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The firstPar is calculated at the firstHit (index 0).