Subject: PndKinVtxFitter
Posted by Alexandr Zinchenko on Tue, 12 Aug 2014 06:48:11 GMT
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Hello.
I was trying to apply a vertex constrained fit to a charmonium candidate (made of J/psi pi+ pi-)
The relevant analysis macro lines are as follows (based on tutorials/rho macros)

```
// *** combinatorics for J/psi -> mu+ mu-
jpsi.Combine(muplus, muminus);

// *** combinatorics for psi(2S) -> J/psi pi+ pi-
psi2s.Combine(jpsi, piplus, piminus);

// ***
// *** do VERTEX FIT (psi(2s))
// ***

for (j = psi2s.GetLength()-1; j >= 0; --j) {
  PndKinVtxFitter vtxfitter(psi2s[j]); // instantiate a vertex fitter
  vtxfitter.SetVerbose();
  vtxfitter.Fit();
```

The printout from PndKinVtxFitter code (activated by the verbosity flag) is:

```
Initial vertex Position is -0.00141313 -0.0154373 -0.0183913
iteration Number  0
 vertex Position is -nan -nan -nan
 chi2 in iterartion -nan
iteration Number  1
 vertex Position is -nan -nan -nan
...
```

Am I doing something wrong or the fitter does not work for such particle combination (1 neutral composite and 2 charged)?

Subject: Re: PndKinVtxFitter
Posted by Ralf Kliemt on Tue, 12 Aug 2014 07:43:11 GMT
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Hello Aleksandr,

Your last assumption is correct. The Vertex Fitters work only on charged particles.

In your special case the vertex fit would not help you much. Both the psi2s and the j/psi decay at the interaction point (0,0,0) if you have not set a smeared interaction region durig simulations. The four momenta are already calculated at (0,0,0) by default.

Cheers

Ralf

Subject: Re: PndKinVtxFitter
Posted by Alexandr Zinchenko on Tue, 12 Aug 2014 11:22:32 GMT
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Maybe I got the logic behind the vertex constrained fit wrong.

In my understanding, this PndKinVtxFitter assumes the decay particles coming from the same vertex
(without assumption on the vertex position itself). Therefore, it can be useful, e.g., to reject background
combinations when building J/psi from 2 charged tracks (if the fit quality is not good enough).

If so, considering also neutrals when building more composite objects would help the same way to reject
background combinations. At least (in my understanding),
such an approach was proposed (and realized) during the PANDA Physics Book preparation - see Sect. 4.2.2.3, subsection
on ppbar-> J/psi pi+ pi-, item 3.

So, it looks like Rho package was able to do such a fit at that time.

Am I wrong?

Subject: Re: PndKinVtxFitter
Posted by StefanoSpataro on Tue, 12 Aug 2014 12:18:17 GMT
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In your case you should build a candidate with the 4 particles and fit it, w/o the virtual state.
And the panda physics book was not using rho.