
Subject: Vertex fitter for two consecutive decays

Posted by [Karin Schönning](#) on Tue, 25 Nov 2014 10:49:49 GMT

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Dear Pandaroot experts,

I am trying to use the vertex fitter to improve the resolution of the Ξ^- mass, reconstructing Ξ^- from the decay $\Xi^- \rightarrow \Lambda \pi^-$, $\Lambda \rightarrow p \pi^-$.

I have used the vertex fitter for the lambda and it works. I take the fitted lambda candidates and combine with a pion which I have checked, using MC truth match, that it is a daughter of Ξ^- and not Λ . Then I try to apply the vertex fit again, see below:

```
-----

Xi.Combine(goodlam,pim);
Xibar.Combine(goodlamb,pip);
for (j=0;j<Xi.GetLength();++j)
{
    //PndVtxPRG vtxfitterx(Xi[j]);
    PndKinVtxFitter vtxfitterx(Xi[j]);    // instantiate a vertex fitter

    bool checkx = vtxfitterx.Fit();
    double chi2_vtx = vtxfitterx.GetChi2(); // access chi2 of fit
    double prob_vtx = vtxfitterx.GetProb(); // access probability of fit

    if (checkx)                                // when good enough, fill some histos
    {

        RhoCandidate *Xiv = Xi[j]->GetFit(); // access the fitted cand
        TVector3 lVtx=Xiv->Pos();
        double Ximassv=Xiv->M();
        double xivz=lVtx.Z();

        cout<<"Xibar mass : "<<Xi[j]->M()<<endl;
        cout<<"Xibar mass vertex: "<<Ximassv<<endl;
        cout<<"Xibar vertex z: "<<xivz<<endl;

        Ximass->Fill(Xiv->M());}

}
```

But when running this I get into trouble, the printout is shown below. Is the vertex fitter supposed to work in this way or does it only handle single vertices?

Error in <TDecompLU::DecomposeLUCrout>: matrix is singular

Error in <TDecompLU::InvertLU>: matrix is singular, 0 diag elements < tolerance of 2.2204e-16

Xibar mass : 0.186496

Xibar mass vertex: 0.167329

Xibar vertex z: 69.2357

Xibar mass : 1.32154
Xibar mass vertex: -nan
Xibar vertex z: -nan
Xibar mass : 1.31012
Xibar mass vertex: -nan
Xibar vertex z: -nan
Xibar mass : 1.32721
Xibar mass vertex: -nan
Xibar vertex z: -nan

Does anybody have an idea of what one can do about this?

Kindest regards,
/Karin
