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Subject: [FIXED] 4Cfit

Posted by [Alexandros](#) on Tue, 13 May 2014 12:20:12 GMT

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Hi,

I am looking in the channel  $\psi(4160) \rightarrow D0\text{-anti}D0$  etc.

I am trying to apply 4C fit in  $\psi(4160)$ .

So what I add in my macro is:

```
PndKinFitter fitter(ψ4160[j]);
fitter.Add4MomConstraint(ini); // set 4 constraint
fitter.Fit();
RhoCandidate *d0fit = ψ4160[j]->Daughter(0)->GetFit(); // get fitted D0
RhoCandidate *antid0fit = ψ4160[j]->Daughter(1)->GetFit(); // get fitted antiD0
```

```
nψ4160->Column("d0fit", (Float_t) d0fit->M());
nψ4160->Column("antid0fit", (Float_t) antid0fit->M());
```

When I run my macro I get something like this:

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

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

It is the same going over and over again.

Is there something wrong???

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Subject: Re: 4Cfit

Posted by [Alexandros](#) on Tue, 13 May 2014 12:25:44 GMT

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The right macro is this:

```
for (j=0;j<ψ4160.GetLength();++j)
{
    nψ4160->Column("ev", (Float_t) i);
    nψ4160->Column("cand", (Float_t) j);
    nψ4160->Column("ncand", (Float_t) ψ4160.GetLength());
    nψ4160->Column("nmct", (Float_t) nψ4160mct);

    PndKinFitter fitter(ψ4160[j]);
    fitter.Add4MomConstraint(ini);
    fitter.Fit();
    RhoCandidate *psif = ψ4160[j]->GetFit();

    nψ4160->Column("ψ2sfit", (Float_t) psif->M());
```

SORRY!!!

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Subject: Re: 4Cfit  
Posted by [StefanoSpataro](#) on Tue, 13 May 2014 12:42:47 GMT  
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Are you should you properly defined your initial state?

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Subject: Re: 4Cfit  
Posted by [Alexandros](#) on Tue, 13 May 2014 12:46:04 GMT  
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You mean my initial 4vector???

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Subject: Re: 4Cfit  
Posted by [StefanoSpataro](#) on Tue, 13 May 2014 12:47:41 GMT  
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Exactly.

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Subject: Re: 4Cfit  
Posted by [Alexandros](#) on Tue, 13 May 2014 12:50:11 GMT  
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```
// *** the lorentz vector of the initial psi(4160)
double m0_p = TDatabasePDG::Instance()->GetParticle("proton")->Mass(); // Get nominal
PDG mass of the proton
TLorentzVector ini(0, 0, pbarmom, sqrt(m0_p*m0_p + pbarmom*pbarmom) + m0_p);
```

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Subject: Re: 4Cfit  
Posted by [StefanoSpataro](#) on Tue, 13 May 2014 12:53:31 GMT  
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How much is pbarmom? Have you compared this 4 vector to what is printed by evtgen in the  
init of the sim macro?

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Subject: Re: 4Cfit  
Posted by [Klaus Götzen](#) on Tue, 13 May 2014 13:13:16 GMT  
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Hi,

if this appears only rarely, this is not a problem - for some combinations the fit fails.

Best,  
Klaus

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Subject: Re: 4Cfit  
Posted by [Alexandros](#) on Tue, 13 May 2014 13:23:58 GMT  
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So in my macro I set pbarm=8.000 and so energy is  $\sqrt{8*8+0.938*0.938}+0.938$  which gives 8.9928 if you make the math.  
But from the EvtGen I get p=8.352 and energy=9.342...  
Do I have to put these numbers in my initial 4vector??

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Subject: Re: 4Cfit  
Posted by [StefanoSpataro](#) on Tue, 13 May 2014 13:28:51 GMT  
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This means that you set p=8.352 in your sim macro?  
Maybe it is better that you upload your sim + dec files.

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Subject: Re: 4Cfit  
Posted by [Alexandros](#) on Tue, 13 May 2014 13:57:17 GMT  
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So, when I call simfast I write:  
`simfast("psi4160","psi4160.dec",8.00000,10000,"psi(4160)")`

I have ran everything before without the 4-5 new lines for the 4Cfit and I get nice results and everything works fine.

Now that I added in the for loop for psi4160 the 4c fit:

```
PndKinFitter fitter(psi4160[j]);  
fitter.Add4MomConstraint(ini);  
fitter.Fit();  
RhoCandidate *psif = psi4160[j]->GetFit();
```

```
npsi4160->Column("psi4160fit", (Float_t) psif->M());
```

it gives me always the error I mentioned before but without crashing!!!!  
So I get a column called "psi4160fit" but the result is exactly the same like the normal psi4160m!!!

## File Attachments

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- 1) [psi4160.dec](#), downloaded 301 times
  - 2) [simfast.C](#), downloaded 294 times
- 

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Subject: Re: 4Cfit

Posted by [StefanoSpataro](#) on Tue, 13 May 2014 14:01:55 GMT

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In this way you are starting from a psi(4160) state, which has a mass well fixed, and evtgen does not take care that you set 8 GeV/c as momentum, it is automatically calculating the momentum from the psi mass.

( $p=8.352$  and  $energy=9.342$ ). Then most probably 8 GeV/c are not enough to form such a state.

The alternative is to start from a pbarpSystem (in both sim and dec), and in such a case your 8 GeV/c will be set. But i think that with this low momentum evtgen will now have the psi(4160) mass.

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Subject: Re: 4Cfit

Posted by [Alexandros](#) on Tue, 13 May 2014 15:12:30 GMT

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I tried the pbarssystem and the problem with the different values of momentum and energy is solved.

But still I have the same kind of error for the 4C fitter...

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Subject: Re: 4Cfit

Posted by [StefanoSpataro](#) on Tue, 13 May 2014 15:14:53 GMT

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But now you are using exactly the same vector which evtgen is printing?

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Subject: Re: 4Cfit

Posted by [Alexandros](#) on Tue, 13 May 2014 15:23:46 GMT

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Yes...I am also looking at it with johan messendorp but he cannot also find something wrong..

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Subject: Re: 4Cfit

Posted by [StefanoSpataro](#) on Tue, 13 May 2014 15:26:13 GMT

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Can you upload your new sim, dec and analysis macros?

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Subject: Re: 4Cfit  
Posted by [Alexandros](#) on Tue, 13 May 2014 15:44:00 GMT  
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### File Attachments

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- 1) [psi4160.dec](#), downloaded 254 times
  - 2) [simfast.C](#), downloaded 278 times
  - 3) [Analysis.C](#), downloaded 300 times
- 

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Subject: Re: 4Cfit  
Posted by [StefanoSpataro](#) on Tue, 13 May 2014 15:45:34 GMT  
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How you call the simfast.C?

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Subject: Re: 4Cfit  
Posted by [Alexandros](#) on Tue, 13 May 2014 15:54:14 GMT  
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.L simfast.C and then simfast("psi4160","psi4160.dec",8.000,10000,"pbarpSystem0")

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Subject: Re: 4Cfit  
Posted by [StefanoSpataro](#) on Tue, 13 May 2014 19:10:39 GMT  
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I have just tried 10k events with the last trunk and scrut14 and I have seen no single error like that.  
Are you sure that you don't have some broken file? Or maybe a screwed installation?

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Subject: Re: 4Cfit  
Posted by [Alexandros](#) on Tue, 13 May 2014 21:37:48 GMT  
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It seems that the problem is that I am using march14 version of pandaroot and not the trunk.  
I will try tomorrow and let you know so that you can close the topic.  
Thanks for your help.

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Subject: Re: 4Cfit  
Posted by [Alexandros](#) on Wed, 14 May 2014 12:25:00 GMT  
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so problem solved!!!!

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i was using march14 version and not the scrut14...  
with scrut 14 4Cfit works...with march14 not..  
you can close the topic!!  
thanks again...

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