
Subject: Re: PndRecoMultiKalmanTask

Posted by [Anonymous Poster](#) on Wed, 31 Mar 2010 15:31:09 GMT

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Hi Stefano and others,

I spent a few hours getting up to speed on what is going on here. First of all: I really appreciate your effort in making a common fitting task for everybody!

Concerning your results:

- The fact that the χ^2/ndf distributions peak at 0.5 is due to the fact that we do not estimate the resolution on the TPC (and possibly others) reco hits correctly. The smearing of TPC clusters depends on the full realistic digitization chain. The exact results for the point resolutions are not known at the moment. However, I can verify that scaling the point resolution by a constant factor of 0.8 makes the distribution peak at ~ 1 . At this point this can not be considered as a major problem, but it will be subject to optimizations by all detector code developers, responsible for putting the right measurement errors into the corresponding reco hits. I can say that in the TPC it looks like we are already within $\sim 20\%$, which is not so bad.

- The tracks which have $\text{NDF}==0$: I could reproduce this effect. I found out that it is due to the fact that all (or almost all) hist in these track failed in the Kalman filter, meaning in particular that the GEANE extrapolation had failed for all hits. You can see that if you get rid of the `GFException::quiet()` switch. The way to catch this, is to evaluate the number of failed hits. You can access it by

```
GFTrack::getFailedHits(int repld)
```

If you do not pass a `repld`, it defaults to the cardinal track representation. You might want to pass this info into `PndTrack` and to the adapter function.

I didn't check, why all the hits fail for these tracks. But I guess it could be due to the fact that the starting values are really wrong or that the starting point maybe is already much behind the first hit or so. If you have further problems in finding out what the problem is, I can try to help.

- about separating different particle hypothesis from χ^2/ndf : This would be very interesting for PID purposes. I am not surprised that the χ^2/ndf distributions look similar. The difference in χ^2 must be very small for each fit. But it would be very interesting to know: Is the χ^2/ndf for the right hypothesis (if only slightly) better than for the others? Maybe you could plot $(\chi^2/\text{ndf}_{\text{kaonHyp}} - \chi^2/\text{ndf}_{\text{pionHyp}})$ for your fits. I am eager to see that! Maybe it might be better to actually use the χ^2 probability for cuts or evaluation instead of χ^2/ndf . You can get it in ROOT via `TMath::Prob(χ^2 ,ndf)`. It should be better especially if ndf differs a lot between fits.

Cheers, Christian
