Subject: Backpropagation in Kalman Filter
Posted by StefanoSpataro on Wed, 08 Apr 2015 12:51:02 GMT

Dear all,
one of the problems of Kalman Filter for secondaries is the backpropagation of the track parameters from the first point of the track to the Interaction Point, before the fit. This back propagation can fail in case of secondaries which are produced far from the IP, decreasing the reconstruction efficiency. For this reason in the past it was suggested to people doing analysis of lambda channels to switch off such back propagation in the PndRecoKalmanTasks of the reco macro.

An update was done, and now track parameters are back propagated of 2 cm before the first hit, to avoid the IP backpropagation. This procedure should be faster, works also for particles not comiing from the IP, it should not fail, and the results for primaries are comparable to the old version.

By default you will use this option automatically just updating your trunk and recompiling. Of course you are free to switch it off (setting a negative distance) and to switch on the IP back propagation, as before.

This change does not affect the PidCorrelator but only the Kalman Filter. This means that you could have the same problem at the pid level and there you should still switch off the back propagation.

Subject: Re: Backpropagation in Kalman Filter
Posted by Elisabetta Prencipe (2) on Wed, 08 Apr 2015 13:37:18 GMT

Hello Stefano,

 just to understand what is the current situation:

when you say

"An update was done, and now track parameters are back propagated of 2 cm before the first hit, to avoid the IP backpropagation. "

do you still refer to genfit(1), in the release march15? or did you give a try to genfit2 on this?

cheers, Elisabetta

Subject: Re: Backpropagation in Kalman Filter
Posted by StefanoSpataro on Wed, 08 Apr 2015 13:39:19 GMT

I tried only genfit1 but the modifications are present for both.

Subject: Re: Backpropagation in Kalman Filter
Posted by donghee on Wed, 08 Apr 2015 19:26:22 GMT

Hi Stefano,

Probably this update is also possible at mar15, I hope.

Best
Donghee

Subject: Re: Backpropagation in Kalman Filter
Posted by StefanoSpataro on Wed, 08 Apr 2015 20:07:57 GMT

The feature is already in the release, simply it is not used by default.
You need to switch off the back propagation and set 2 as propagation distance in the reco macro:

```
...
recoKalman->SetPropagateToIP(kFALSE);
recoKalman->SetPropagateDistance(2.f);
...
recoKalmanFwd->SetPropagateToIP(kFALSE);
recoKalmanFwd->SetPropagateDistance(2.f);
...
```

In reality because of a small bug it will back propagate of 1 cm and not 2 cm, but it will be fine the same.