
Subject: Error calculation in Kalman Filter

Posted by [Anonymous Poster](#) on Fri, 27 Feb 2009 21:33:38 GMT

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Hi everybody,

something about the Kalman filter came to my attention: We are fitting the same track several times in the Kalman filter. This is to reduce biasing of the results due to wrong starting values (which is to some extent unavoidable). This procedure however will lead to wrong errors on the track parameters. When I fit a track n times, the error will be $1/\sqrt{n}$ times what it should be. All the information has been used n times. To avoid this we need to blow up the covariance matrix, before the repeated fitting. Maybe this might even make things a bit more stable, although I doubt that.

Does anybody use the errors on the track parameters (and for that matter on the position and the momentum) after GenFit? If so, your results are subject to smaller errors.

I think this should be changed in principle. I can't volunteer at this point to do it (and most importantly test it), but I wanted to bring it to attention. I am very caught up in COMPASS data analysis these days. Before that I rebuilt and upgraded the small TPC prototype and worked on the test beam. These are the main reasons, why my contributions to PANDAROOT are much less than before.

My first approach would be this: Before changing direction after one full pass, one should drop all off-diagonal entries of the covariance and multiply the diagonal elements with a large factor (10 or so). That should do it.

Have a nice weekend!

Christian

Subject: Re: Error calculation in Kalman Filter

Posted by [Bertram Kopf](#) on Fri, 27 Feb 2009 22:16:03 GMT

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Hi Christian,

Christian Hoeppe wrote on Fri, 27 February 2009 22:33

Does anybody use the errors on the track parameters (and for that matter on the position and the momentum) after GenFit? If so, your results are subject to smaller errors.

The errors of the track parameters are one of the most important input for the kinematic and vertex fitters used in the analysis part. For this it must be guaranteed that the errors are correct. If not it could lead to completely wrong results.

Have a nice weekend,
Bertram.
