

## The most beautiful line you can draw with Kalman filter (1/2)

*Monday, 6 March 2023 09:30 (1 hour)*

Track fitting is an everyday repetitive task in the high energy physics detector reconstruction chains. The precision and stability of the fitter depend on the available computing resources. A fit might cost up to half of the CPU time, that is spent on reconstruction. Kalman filters are a widespread solution for the track fitting. A classical Kalman filter is a powerful tool, that is applicable to the linear problems with Gaussian-like errors. However, in reality one has to deal with non-linear problems and sometimes with non-Gaussian errors. The numerical overhead results in instabilities and slows down the convergence. Physics and reparametrisation can help to improve the fit performance. Starting from the simple Kalman filter, we build up a more realistic Kalman filter, discussing practical tricks and possible issues of implementation. We then talk about implementation differences if using CPU or GPU.

### Attended school

### Exercise hours

### Lecture hours

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**Track Classification:** Physics computing