Hi Lia,

well your question is a really good one. I do not have an easy answer in the moment. It is a general problem with all tracks with all track representations. This is not specific to genfit as far as I can tell.
For example in COMPASS where we use x,y,dx/dz,dy/dz,q/p and z as the free parameter (which is some sense the DetPlane in genfit) we just know that tracks fly along the z-axis. I ALICE, whose track model I also looked at, you also dont have a parameter which gives the direction of the track. In most cases it is clear: it comes from the vertex. For secondary vertices with low momenta this doesnt work and we need a different idea.

Here are several points for discussion (Sebastian give some of your brains into this please, too):
- should we just have a sixth paramter? I dont really see a problem with that
- can we tackle the problem from hit sorting, saying that hits have to be sorted before the fitter so they always go with increasing track length?
- maybe more...

Here is my thought about the issue of direction: We need this info to decide whether to propagate a track fowards or backwards. We can leave this decision to the Kalman filter algorithm. Then this info should never appear in the trackRep and is just an argument to extrapolate(). Or we could leave it completely to the track representation then this info should not appear anywhere else. In this case we would maybe need the sixth parameter.

If i dont overlook any detail, the idea of an additional parameter looks good. In that case the trackRep is itself responsible for determining forward or backward tracking.

Any thoughts? What did I miss?

Christian