Track Z -Algorithm 11

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Abstract

2) The track z and d0 you are using is we think the z-coordinate of the track at the 3-d space point at closest approach of the track to the line passing through CDF (0,0,0) at zero angle - the tracks are not vertex constrained. But you must check with a tracking expert and look at the code for your algorithm 11 tracks to see exactly how the tracks are fit and what the track parameter z really means. I will call this 3-d point the track vertex. You can make no progress unless you know PRECISELY the meaning of the track parameters you are using and how to extrapolate tracks to different points in space. You might consult b group people who must understand this stuff. They must have algorithms which hunt for 3-d secondary vertices and then find the significance of deviations of such vertices from the true beamline.

1 Understanding Track Algorithm 11

For both the Electron Track and the tracks in the jet selcted for average,Ihave chosen to ask them tobe of Track Algortihm 11.Since algorithm number does not tellus enough about the parameters of the Track selected,It is important to understand the algorithm in detail.

This table below takes us to the brief description of what Track Algorithm means in terms of the known paramters

Algorithm	Number	Description
NoSpecifiedAlg	0	Not Used
SvxStandAloneAlg	1	Obsolete
CotStandAloneAlg	2	Standard COT after Merge
InsideOutAlg	3	Silicon Standalone with cot hits added
OutsideInAlg	4	OI RPhi Only
MergedAlg	5	Not Used
GlobalAlg	6	Not USed
IntegratedSiRPhiAlg	7	Obsolete
IntegratedSiRZAlg	8	Obsolete
IntegratedCotRPhiAlgA	9	Obsolete
IntegratedCotRPhiAlgB	10	Obsolete
OutsideIn3DAlg	11	OI RPhi,SAS and Z
CotHLA	12	COT Axial Histogram linking algorithm(internal to tracking code)
CotHLB	13	Obsolete
CotSL	14	COT Axial segment linking algorithm(internal to tracking code)
CotPT	15	COt perfect Tracking (sim only)
KalSvxStandAloneAlg	16	Silicon Standalone
KalOutsideIn3DAlg	17	Kal OI RPhi,SAS and Z
KalRPhiOIAlg	18	Obsolete
KalPerfectTrackingAlg	19	Obsolete
SiPT	20	inking algorithm(internal to tracking code)
KalSoftStandAloneAlg	21	low pt silicon standalone (new as of 5.3.1)
OutsideInStereoAlg	22	OI rphi and SAS
KalOutsideInStereoAlg	23	Kal OI rphi and SAS
KalOutsideInAlg	24	Kal OI rphi only

1.1 OI Tracking - Outside In Tracking

The Silicon tracking algorithm in the central region takes advantage of the COT pattern recognition and high spatial resolution provided by the Silicon Detectors.

We do 3D tracking by searching for 3-D silicon hits.The first of theOI trackign strategy is when for a given COT track we the Rϕ trackign first toselect the best candidate.The 3D part comes in when after running OI tracking as above add Z Silicon hits where Rϕ are already found.

Now the Z hits being added could be small angle stereo layer hits or 90 degree layer hits.In the case of the Track Algorithm 11 in question, the 3D tracking involves only the Z hits from the small angle stereo layer hits.A New track candidate s generated for each R-ϕ-SAS-Z (i.e 3D hit) and then extrapolated to next layer to look for more such hits if there were present.The candidate that has the maximum number of hits in Silicon layers is chosen as the final candidate.If more than one candidate has the same number of hits ,the $\chi^2$of thefit in the Silicon is used as a discriminator.

A Progressive χ^2 fit is used for getting the helical matrix.

References

[1] CDF 1790 – Basic Tracking Varibles decriptions and the relation between the Track parameters

[2] CDf 1924 – More SVX Tracking Specific varibles from RUN I

[3] CDF 5991 Outside In Silicon Tracking with emphasis on the Patter recognition part of Tracking

[4] CDF 5897— Outside InTracking with Emphasis on the Patten Recognition part of the Tracking