

Pattern recognition and estimation methods for track and vertex reconstruction

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The reconstruction of charged tracks and interaction vertices is an important step in the data analysis chain of particle physics experiments. I give a survey of the most popular methods that have been employed in the past and are currently employed by the LHC experiments. Whereas pattern recognition methods are very diverse and rather detector dependent, fitting algorithms offer less variety and can be applied to both track and vertex estimation with minimal changes. In particular, I trace the development from standard least-squares estimators to robust and adaptive estimators in both contexts. I end with an outlook to what I consider the most important issues to be addressed by experiments at future colliders such as the SuperLHC, the upgraded B-factory at KEK, and the ILC.

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