

Global track finding algorithms

Monday 4 March 2019 13:30 (1 hour)

In high energy physics experiments the reconstruction of tracks of charged particles provides the core for the measurements of these particles' properties. Track finding algorithms can roughly be divided into two main categories: local and global. Local track finding algorithms try to link individual hits one by one while utilizing a variety of smart techniques to mitigate combinatorial complexity, whereas global track finding algorithms treat all hits simultaneously.

In this lecture we will look into track finding algorithms in wire chambers that are performed on all hits at once. The search is done by converting individual hit parameters to a curve in a dual space using Legendre or Hough transform, with the intersection of multiple curves corresponding to a track compatible with given hits. Then, the problem of finding a track is translated to the problem of finding most densely populated regions in the dual space which can be done effectively and quickly by a quadtree search.

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Track Classification: Lectures and exercises