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Application of Kalman filter methods to event filtering and reconstruction for Neutrino Telescopy

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Event reconstruction in underwater neutrino telescopes suffers from a high background noise due to the K^{40} decays. Adaptive algorithms are able to suppress automatically such a noise and therefore are considered as good candidates for track fitting at the KM3NeT environment. Adaptive algorithms, based on Kalman Filter methods, are extensively used in accelerator particle physics experiments, for event filtering, track reconstruction and vertex definition. In this note we describe an iterative event filtering and track reconstruction technique, employing Kalman Filter methods and we present results from a detailed simulation study concerning the KM3NeT detector. We evaluate the accuracy of this technique and we compare its efficiency with other standard track reconstruction methods.

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