TESTING HYPOTHESES ABOUT PARALLEL TRACKS

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Position of n points, which determine location of reference point of a locomotive in moments t_1 ,... ,t_n are estimated by the help of navigation satellites. Problem is to test a hypotheses that the locomotive moves along a supposed track. An alternative hypotheses is that it moves along a track parallel. Investigated part of the track is linear and horizontal coordinates give the locations of points.

It is impossible to create a test by the help of estimators of parameters of a straight line by a standard method, since the position of the points are measured with non-negligible errors both in x and y coordinates. In addition the covariance matrix of the vector estimator of the coordinates has non-diagonal structure.

A solution of the problem is given under assumption that results of measurement are normally distributed and the covariance matrix has form σ^2V, where V is given positive definite matrix and $\sigma \in (0, \infty)$ is an unknown parameter.