



# Mixed Semidefinite and Second-Order Cone Optimization Approach for the Hankel Matrix Approximation Problem

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**Abstract:** Approximating the nearest positive semidefinite Hankel matrix in the Frobenius norm to an arbitrary data covariance matrix is useful in many areas of engineering, including signal processing and control theory. In this paper, interior point primal-dual path-following method will be used to solve our problem after reformulating it into different forms, first as a semidefinite programming problem, then into the form of a mixed semidefinite and second-order cone optimization problem. Numerical results, comparing the performance of these methods with the modified alternating projection method will be reported.

**Keywords:** *Hankel matrix; primal-dual interior-point method; projection method; semidefinite programming.*

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