

L^1 -Optimal Splines for Outlier Rejection

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In this presentation, we consider control theoretic splines with L^1 optimization for rejecting outliers in data. Control theoretic splines are either interpolating or smoothing splines, depending on a cost function with a constraint defined by linear differential equations. Control theoretic splines are effective for Gaussian noise in data since the estimation is based on L^2 optimization. However, in practice, there may be outliers in data, which may occur with vanishingly small probability under the Gaussian assumption of noise, to which L^2 -optimized splines may be very sensitive. To achieve robustness against outliers, we propose to use L^1 optimality, which is also used in support vector regression. A numerical example shows the effectiveness of the proposed method.

Key Words: Smoothing splines, control theoretic splines, outlier rejection, L^1 optimization, support vector regression