

Regularization methods for high-dimensional variable selection and estimation have been intensively studied in recent years and most of them are developed in the framework of linear regression models. However, in many real data problems, e.g., in compressive sensing, X-ray crystallography, sensor networks and optical imaging, the response variables are nonlinear functions of the unknown parameters. In this paper we introduce a so-called quadratic measurements regression model that extends the usual linear model. We study the l_1 -regularized least squares method for variable selection and establish the weak oracle property of the l_1 -RLS estimator. Moreover, we derive a fixed point equation and use it to construct an algorithm for numerical optimization. Numerical examples are given to demonstrate the finite sample performance of the proposed method and the efficiency of the algorithm.