

# Slow and Fast Oracle Inequalities in Quadratic Regression Model

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October 10, 2024

## Title:

Slow and fast oracle inequalities in quadratic regression model.

## Abstract:

We consider an extension of the regular linear regression model called the *quadratic regression model*, where we add the order interactions of the explanatory variables:

$$Y = \sum_{j=1}^p X^{(j)} \beta_j^* + \sum_{1 \leq j \leq k \leq p} \theta_{\varphi(j,k)}^* X^{(j)} X^{(k)} + \varepsilon,$$

where  $\varphi : 1, p^2 \mapsto 1, q$  is a mapping function which assigns to every pair of indices  $1 \leq j \leq k \leq p$  an index  $1 \leq l \leq q = \frac{p(p+1)}{2}$ . The **sprinter** algorithm is a three-step procedure that performs variable selection and estimation. We study its theoretical properties: in particular, we state fast and slow oracle inequalities for **sprinter**.