

## Consistency of Multi-dimensional Convex Regression

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- [LimG12.pdf](#)

Convex regression is concerned with computing the best fit of a convex function to a data set of  $n$  observations in which the independent variable is (possibly) multi-dimensional. Such regression problems arise in operations research, economics, and other disciplines in which imposing a convexity constraint on the regression function is natural. This paper studies a least squares estimator that is computable as the solution of a quadratic program and establishes that it converges almost surely to the “true” function as  $n \rightarrow \infty$  under modest technical assumptions. In addition to this multi-dimensional consistency result, we identify the behavior of the estimator when the model is mis-specified (so that the “true” function is non-convex) and extend the consistency result to settings in which the function must be both convex and non-decreasing (as is needed for consumer preference utility functions).

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