

Title: Stochastic optimization in electricity pool markets

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Over the past decade, markets for electric power have emerged in many countries. The details of the market mechanisms differ from place to place, but most of them depend on some centralised dispatch pool which sets a price for electricity. Supply and demand decisions are made in advance of this price being set (and affect it) so they are subject to uncertainty (e.g. from fluctuating wind generation or a lack of knowledge about the decisions of other market participants). To accommodate this uncertainty, electricity generators offer supply functions rather than fixed generation quantities. Choosing an optimal supply function is then an infinite-dimensional stochastic optimization problem. In my talk I will show how this problem can be attacked using variational techniques that are based on a “market distribution” function. The methodology will be illustrated by showing some examples of optimization models based on these ideas that are being used in the New Zealand electricity market.