



THE UNIVERSITY OF
CHICAGO

Department of Statistics

MASTER'S THESIS PRESENTATION

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Multi-Modal Data-Driven Distributionally Robust Optimization

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ABSTRACT

Many problems of interest require minimization of functions that are subject to stochastic input whose distribution is unknown. Distributionally robust optimization is a method of optimization that allows to account for the uncertainty in the stochastic input by initially performing a maximization over an appropriate family of distributions and only then performing the minimization with respect to the control variables. Specifically, in data-driven problems all the information about the stochastic parameters is given in terms of a sample from the distribution. In this work we extend a previously established framework for data-driven distributionally robust optimization into a setting where the data is also assumed to be multi-modal. Multi-modality has not been thoroughly treated in previous works on this subject and we introduce a completely new method of incorporating multi-modality into the framework of distributionally robust optimization. Many problems of interest require minimization of functions that are subject to stochastic input whose distribution is unknown. Distributionally robust optimization is a method of optimization that allows to account for the uncertainty in the stochastic input by initially performing a maximization over an appropriate family of distributions and only then performing the minimization with respect to the control variables. Specifically, in data-driven problems all the information about the stochastic parameters is given in terms of a sample from the distribution. In this work we extend a previously established framework for data-driven distributionally robust optimization into a setting where the data is also assumed to be multi-modal. Multi-modality has not been thoroughly treated in previous works on this subject and we introduce a completely new method of incorporating multi-modality into the framework of distributionally robust optimization.

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