



Department of Mathematical Sciences  
Seminar in Stochastic Systems

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*Portfolio Optimization with Drawdown Constraints*

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*Abstract:* By definition, portfolio drawdown is a drop in the portfolio value compared to the previous maximum. We study a measure of risk, which depends on the portfolio drawdown curve (also called underwater curve) considered in active portfolio management. The new risk measure, Conditional Drawdown-at-Risk (CDaR), is defined as the mean of the worst  $x$ th Conditional Values-at-Risk risk measure. The CDaR risk measure has several important properties, which make it attractive from a practical perspective: (1) compared to variance or Value-at-Risk (VaR), it adequately reflects investors' preferences; (2) it is robust: it depends upon many significant drops in the portfolio value rather than on one extreme event; (3) information on sequence of events is not lost (compared to approaches such as VaR or variance); (4) minimal data requirements: historical data can be directly used for path generation; (5) the technique is very stable numerically; (6) can be efficiently implemented using Linear Programming techniques. Some practical recommendations on how to use the CDaR measure for getting practically stable portfolios are provided. Using CDaR, we solved a real life allocation problem for a portfolio of derivatives.

Dr. Stan Uryasev is a professor at the University of Florida, and the director of the Risk Management and Financial Engineering Laboratory. His research is focused on the development of efficient computer modeling and optimization techniques and their applications in finance and military projects, including: 1) Risk management 2) Portfolio optimization; 3) Asset and Liability modeling; 4) Classification in financial applications, and 5) Optimal trading strategies. He has published three books (a monograph and two edited volumes) and about seventy research papers.