Computational Perspectives on Multistage Stochastic Programming

Murwan Siddig

PhD Student

Department of Industrial Engineering

Clemson University

June 10, 2020

Abstract: Multistage Stochastic Programming (MSP) is a class of decision-making models where the decision-maker may adapt and control the behavior of a probabilistic system sequentially over multiple stages. The stochasticity aspect and the nested form of the decision-making structure in MSP problems give rise to an exponential growth in computational resources requirements. To mitigate this computational burden, we propose several algorithms which extend the adaptive partition-based approach for solving two-stage stochastic programs with fixed recourse to the multistage linear setting. Our proposed algorithms integrate the adaptive partition-based approach to a popular approach for solving MSP problems known as stochastic dual dynamic programming (SDDP). Our numerical experiments on a hydro-thermal power generation planning problem show the effectiveness of the proposed extensions. We further extend this analysis by presenting a numerical perspective on the value of MSP problems in the rolling-horizon procedure.

Talk will take place from 1:00PM - 2:00PM on Wednesday, June 10, 2020 through Zoom (invitation will be emailed to everyone soon).