On the role of an Isaacs equation in importance sampling for stochastic networks

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Abstract

Although the use of importance sampling in the context of stochastic networks was first proposed many years ago, a general method for constructing good schemes has been lacking, even for the most simple networks. In this talk we discuss how the optimal performance of importance sampling is related to a differential game, and in terms of this game explain why some previously proposed heuristics can fail Related to the differential game is an Isaacs equation (a nonlinear partial differential equation), which characterizes the value function of the game We will show how subsolutions to the Isaacs equation can be used to design an analyze nearly optimal importance sampling schemes, and discuss methods for constructing subsolutions.

Joint with Devin Sezer and Hui Wang