Type: Minisymposium Contribution

## Approximating optimal value functions with neural networks under a decaying sensitivity assumption

Tuesday, August 13, 2024 9:00 AM (30 minutes)

In this presentation, we consider interconnected optimal control problems, wherein the interconnection is represented as a graph. We establish a decaying sensitivity condition, where the influence between graph nodes diminishes with their distance, and leverage this assumption to construct a separable approximation of the optimal value function. This approach allows us to identify scenarios in which neural networks can effectively address the curse of dimensionality associated with approximating optimal value functions, requiring only polynomial growth in the state dimension for the number of neurons. Additionally, we outline a suitable neural network architecture and corresponding training algorithm. To provide empirical validation of our theoretical framework, we present results from a numerical test case.

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