

数学与系统科学研究院

计算数学所学术报告

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报告题目:

**Computing pure strategy Nash equilibria in Compact Symmetric Games**

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计算数学所报告厅

## **Abstract:**

We analyze the complexity of computing pure strategy Nash equilibria (PSNE) in symmetric games with a fixed number of actions. We restrict ourselves to “compact” representations, meaning that the number of players can be exponential in the representation size. We show that in the general case, where utility functions are represented as arbitrary circuits, the problem of deciding the existence of PSNE is NP-complete. We give polynomial-time algorithms for finding a sample PSNE, counting the number of PSNEs, and also provide an FPTAS for finding social-welfare-maximizing equilibria. We extend our piecewise-linear representation to achieve what we believe to be the first compact representation for parameterized  $\text{\emph{families}}$  of (symmetric) games. We provide methods for answering questions about a parameterized family without needing to solve each game from the family separately.

This is joint work with Albert Xin Jiang (USC) and Kevin Leyton-Brown (UBC)

欢迎大家参加!