

Peer Review

Review of: "Local and Global Optima: Sheaves and Polynomial Approximations"

Cuicui Zheng¹

1. New Jersey Institute of Technology, United States

This paper explores the challenging problem of reconstructing an agent's global preferences, specifically how optimal choices can be derived from solutions to localized decision problems. Using a sheaf-theoretic framework, the authors offer an abstract mathematical characterization of the global solution. Furthermore, they propose polynomial approximation methods to recover these global optima when only limited local information is available. The integration of sheaf theory provides a sophisticated and potentially powerful approach to understanding how local solutions inform global preferences. The mention of polynomial approximations indicates an effort to develop computationally feasible methods for the problem.

However,

1. More context on previous research or existing approaches to preference reconstruction could help situate the contribution.
2. Clarifying the practical implications or specific applications would enhance the paper's relevance.

Overall, they present a novel approach to preference analysis and promise developments in reconstructing agent preferences, especially when data is scarce. It is well-written and has a good theoretical foundation. But there are still improvements needed in applying those theories in specific areas and making practical meaning.

Declarations

Potential competing interests: No potential competing interests to declare.