

Discovering mathematical concepts through a multi-agent system

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Progress in mathematics is often the result of a dynamic interplay between posing questions based on existing knowledge and attempts to answer them. In this talk, I present a novel multi-agent reinforcement learning system that attempts to computationally model this process. The system is able to discover and use the concepts of homology and Euler characteristic from incidence matrix data and linear algebra, addressing an open challenge in the literature. Ablation studies show that the full system outperforms its counterparts with components removed, confirming the hypothesis that each element of the dialectic plays a crucial role.