Using path and star decompositions to design Derivative Computation task sets

Haile Gilroy, Auburn University

The Theory of Combinatorial Designs is a broad abstract field with a rich research history. Research in Undergraduate Mathematics Education is an analogous field with its own well-established methodologies and history. In recent years, graphs (usually under the pseudonyms "maps" or "networks") have emerged in mathematics education research as a tool for modeling various educational structures including departmental social networks, problem-solving strategies, and even literature reviews. Given this promising connection between discrete mathematics and mathematics education research, might it be possible to leverage Design Theory results to design components of undergraduate mathematics courses? In Mathematics Education research, skills-based task sets are sets of exercises whose solutions require fluency in narrowly defined procedures (such as derivative computations in Calculus I). In this talk, applications of path and star decomposition results to Derivative Computation task set design are discussed.

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