SIAM/APPLIED AND NUMERICAL ANALYSIS SEMINAR

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Speaker: Peter Kvam

Title: Open mathematical and computational problems in psychology

Abstract: The brain, and the cognitive processes it implements, are complicated and can be quite difficult to measure. Decisions, response times, similarity judgments, confidence, and neuroimaging data can all shed light on cognitive mechanisms, but much of the theoretical legwork in understanding cognition requires sophisticated quantitative tools and analyses. In this talk, I outline some of the major theoretical and computational problems that I think are facing the field. These include, for example, empirical failures of measurement invariance, the geometric structure of subjective representations, the role of non-classical probability theories, and more practical problems like how to create accessible model-fitting tools for psychological researchers with scant computational or mathematical training. I discuss some solutions that have been proposed as well as potential roles that applied mathematicians might play in future work.