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Recent algorithmic advances for maximum-entropy sampling

Abstract: The maximum-entropy sampling problem (MESP) is to select a subset, of given size s, from a set of correlated Gaussian random variables, so as to maximize the differential entropy. If C is the covariance matrix, then we are simply seeking to maximize the determinant of an order-s principal submatrix. A key application is for the contraction of an environmental-monitoring network. MESP sits within the intersection of optimization and data science, and so it has attracted a lot of recent attention. The problem is NP-hard, and there have been algorithmic attacks aimed at exact solution of moderate-sized instance for three decades. It is a fascinating problem from the perspective of integer nonlinear optimization, as it does not fit within a framework that is successfully attacked via available general-purpose paradigms. I will give a broad overview of algorithmic work, concentrating on the many useful techniques related to various convex relaxations.

Bio: Jon Lee obtained his Ph.D. at Cornell University. He has held long-term positions at Yale University, University of Kentucky, IBM Research, and New York University. Now at the University of Michigan, Jon is the G. Lawton and Louise G. Johnson Professor of Engineering and Professor of Industrial and Operations Engineering. He is author of "A First Course in Combinatorial Optimization" (Cambridge University Press), "A First Course in Linear Optimization" (Reex Press), and "Maximum-Entropy Sampling: Algorithms and Application" (with M. Fampa). Jon was the founding Managing Editor of the journal Discrete Optimization, and he is currently Editor-in-Chief of Mathematical Programming, Series A. Jon is an INFORMS Fellow, and he has received the INFORMS Computing Society Prize.

Link to the Zoom session:
`https://us02web.zoom.us/j/81100173104?pwd=HTAZbKF9g2xEHgWl3y68G3v4oSyj9L.1`