Title: Online Connectivity Augmentation

Speaker: Dr. Mohit Garg

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Abstract:

The Connectivity Augmentation Problem (CAP) is a fundamental problem in fault-tolerant network design and has been extensively studied in the context of approximation algorithms. In this work, we study CAP in the online setting: given a k-edge-connected graph G and a set L of additional edges (called links) over the vertices of G, online requests arrive sequentially, each specifying two vertices that must be made (k+1)-edge-connected. Starting from G, we must progressively add links to satisfy these requests. More precisely, upon the arrival of a request {u,v}, we must immediately and irrevocably add zero or more links from L so that u and v are (k+1)-edge-connected in the augmented graph. The objective is to minimize the total number of links added, and the performance of an algorithm is measured by its competitive ratio relative to an optimal offline solution.

In this talk, I will present results on online connectivity augmentation, including a tight competitive ratio for online CAP. This is joint work with Aditya Subramanian.

Speaker Bio:

Mohit Garg received his PhD from the Tata Institute of Fundamental Research, Mumbai, in 2016. He subsequently held research positions in Japan, Israel, Switzerland, and Germany, and since 2023 has been affiliated with the Indian Institute of Science, Bengaluru. His research lies in theoretical computer science, with contributions to combinatorial optimization, fault-tolerant network design, algorithms, circuit complexity, and information compression and retrieval. He has also been involved in developing a formal framework for the design and regulation of financial exchanges.