Vertex Coloring with Communication and Local Memory Constraints in Synchronous Broadcast Networks

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Abstract

The talk will address the broadcast/receive communication model in which message collisions and message conflicts can occur because processes share frequency bands. (A collision occurs when, during the same round, messages are sent to the same process by too many neighbors. A conflict occurs when a process and one of its neighbors broadcast during the same round.) More precisely, the paper considers the case where, during a round, a process may either broadcast a message to its neighbors or receive a message from at most m of them. This captures communication-related constraints or a local memory constraint stating that, whatever the number of neighbors of a process, its local memory allows it to receive and store at most m messages during each round. The paper defines first the corresponding generic vertex multi-coloring problem (a vertex can have several colors). It focuses then on tree networks, for which it presents a lower bound on the number of colors K that are necessary (namely, K=\Delta+m+1, where \Delta is the maximal degree of the communication graph), and an associated coloring algorithm, which is optimal with respect to K. (Proc. Intl Symposium on Algorithms and Experiments for Wireless Sensor Networks (ALGOSENSORS'16), Springer LNCS 10050, pp.-29-44, 2016.)

About the Speaker

Michel Raynal has been a Professor of Informatics since 1981 (Sup Telecom Brest 1981-83, and then University of Rennes 1). Since 2017 he is also Chair Professor at Polytechnic University of Hong Kong. He is a senior member of the prestigious "Institut Universitaire de France" and "Academia Europaea". In 1983 he founded one of the very first research groups on Distributed Algorithms at INRIA. Michel Raynal's interests include distributed algorithms, distributed computability, distributed computing systems and dependability. His main interest lies in the fundamental principles that underlie the design and the construction of distributed computing. He has been Principal Investigator of a number of research grants in these areas, and has been invited by many universities all over the world to give lectures and tutorials on distributed algorithms and fault-tolerant distributed computing systems. Michel Raynal belongs to the editorial board of several international journals. He published more than 150 papers in international journals (from JACM to IEEE Computer), and more than 300 papers in international conferences. He has also written eleven books devoted to parallelism, distributed algorithms and systems (published by MIT Press, Wiley, Morgan & Claypool and Springer). His last two books are "Concurrent Programming: Algorithms, Principles and Foundations" (Springer), and "Distributed Algorithms for Message-passing Systems" (Springer). His h-index is 57, and his i10-index is 254.

All are welcome!

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