Majority-rule consensus: from preferences (social choice) to trees (biology)

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Abstract

The problem of aggregating the individual preferences of a group of “voters” into a group consensus preference has been studied for many years. Indeed, mathematical investigations of consensus problems go back to the contributions of Borda (1770), of Condorcet (1785), and of Pareto (1896) and are still frequently cited today. One method, the compelling majority-rule consensus, is so simple (stick something in the output if it is in more than half of the input) that it seems nothing really interesting can be said about it. This presentation will give some historic background from the classical preference case (e.g., voting), and then point out some new and old mathematical and computational complexity results pertaining to the use of the majority-rule paradigm for finding consensus phylogenetic trees (biology) and classification structures (data analysis).

Biography

F.R. McMorris is Dean of the College of Science and Letters, Professor of Applied Mathematics and Professor of Computer Science at Illinois Institute of Technology.

The professional life of Professor McMorris began in 1969 with a Ph.D. in mathematics awarded by the University of Wisconsin-Milwaukee. In 1971, he accepted a two-year post-doctoral fellowship in biomathematics at North Carolina State University. Since then, he has worked primarily in the area of applied mathematics and theoretical computer science. He has published more than 130 research papers and five books while obtaining significant grant funds.

McMorris spent 15 years at the University of Louisville where he was Assistant Vice President for Research, Distinguished University Scholar, and Professor of Mathematics. He led the effort at Louisville to create a high profile interdisciplinary Logistics and Distribution Institute and served as Acting Director for one year. During the 1980s he served as Chair of the Department of Mathematics at Louisville and as Scientific Officer for Discrete Mathematics at the Office of Naval Research.

In 1999, he joined IIT as chair of the Applied Mathematics Department, where he developed new applied mathematics degree programs and increased the department’s research activities. He was named Dean of the College of Science and Letters in 2003. He currently is President-Elect of the International Federation of Classification Societies and has served, or is serving, on various editorial boards.

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