

SEMINAR SERIES
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Generating Experimental Data for Scheduling Problems

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The operations research literature provides little guidance about how data should be generated for the computational testing of algorithms or heuristic procedures. We discuss several data generation schemes which are widely used in the literature, and we demonstrate that they may introduce biases into computational results. Moreover, some of those schemes are not representative of the way data arises in practical situations. We address these deficiencies by describing several properties that are desirable in a generation scheme. We then focus on scheduling problems, for which we develop measurable characteristics that are associated with these properties. This enables us to provide specific proposals for the generation of scheduling problems with release dates, with due dates, with deadlines, and with precedence constraints. For precedence constraints, we provide the first generation scheme that achieves a uniform target density in the precedence constraint graph. We also identify several related issues that may influence the design of a generation scheme. Finally, we provide three case studies that illustrate, for specific scheduling problems, how our proposals can be implemented to design a data generation scheme.

Nicholas G. Hall is Professor of Management Science, Operations Management and Industrial Engineering at Ohio State University. He holds degrees in economics from the University of Cambridge, a professional qualification in accounting, and a Ph.D. in management science (1986) from the University of California, Berkeley. His research interests are in the control of manufacturing systems, especially in modern manufacturing environments, and in applications of operations research. He is the owner of CDOR, a central Ohio consulting business that provides applications of operations research to industry and local government. He serves as one of the two academic representatives on the Ohio Steel Industry Advisory Commission. He also serves as Associate Editor of the journals *Operations Research*, *Management Science*, and *IIE Transactions*.