

THE UNIVERSITY



OF HONG KONG

Department of Mathematics

# Operations Research Group Seminar (ORG)

April 18, 2002 (Thursday)

4:00 – 5:00pm

517 Meng Wah Complex, HKU

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3:30pm – 4:00pm    Cookies & Tea Time

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## *Configuring a Manufacturing Firm's Supply Network with Multiple Suppliers*

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\* Speaker

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**All are welcome**

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<http://hkumath.hku.hk/~org>

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## *Configuring a Manufacturing Firm's Supply Network with Multiple Suppliers*

### Abstract

Consider a supply network consisting of a manufacturer and its suppliers. The manufacturer produces different types of products, using a common set of inputs (e.g., raw materials and/or component parts) from the suppliers: but, each product needs a different mix of these inputs. The manufacturer sells its finished products to the market at the end of the current decision horizon, facing an uncertain market demand. In situations where a manufacturer has out-sourced its parts production to contract manufacturers, the contract manufacturer's capacity available for the given manufacturer in a particular time period may be limited by "capacity reservation" agreements made in advance. Thus, in making production mix decisions for the current planning horizon, the manufacturer has to take into account both its own and the component suppliers' capacity restrictions. We develop a mathematical model and an iterative algorithm that helps the manufacturer solve its supply configuration problem, that is, *how much of each raw material and/or component part to order from which supplier, given capacity limits of suppliers as well as the manufacturer*. The model takes into account such factors as market demand uncertainty, costs and product characteristics. We present a numerical example to illustrate the interacting effects among critical parameters in the model, and apply the model to a real-world case of a computer manufacturer.

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