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สินค้าหลายแห่ง



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A MULTI-ITEM MULTI-DEPOT INVENTORY ROUTING PROBLEM

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A Dissertation Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy Program in Industrial Engineering

Department of Industrial Engineering

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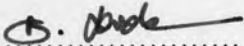
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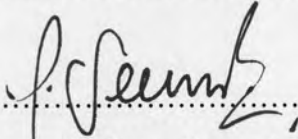
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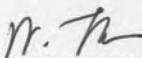
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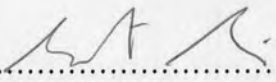
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ชยรัช เผือกสามัญ : ปัญหาการจัดการการขนส่งและกำหนดปริมาณการจัดส่ง ที่มีสินค้าหลายชนิด และมีจุดกระจายสินค้าหลายแห่ง (A MULTI-ITEM MULTI-DEPOT INVENTORY ROUTING PROBLEM). อ. ที่ปรึกษาวิทยานิพนธ์หลัก : ผศ. ดร. ปวีณา เชาวลิตรวงศ์, 130 หน้า.

วิทยานิพนธ์ฉบับนี้ได้ศึกษาเกี่ยวกับการหาคำตอบของปัญหาการจัดการการขนส่งและกำหนดปริมาณการจัดส่ง ที่มีสินค้าหลายชนิด และมีจุดกระจายสินค้าหลายแห่ง ในปัญหาที่ทำการศึกษานี้ สินค้าหลายชนิดจะถูกส่งจากจุดกระจายสินค้าที่มีหลายแห่งไปยังร้านค้าหลายร้านภายในช่วงเวลาหนึ่ง การขนส่งจากจุดกระจายสินค้ากระทำโดยยานพาหนะที่มีความเหมือนกันหลายคัน และแต่ละคันมีความสามารถในการขนส่งที่จำกัด ความต้องการในสินค้าแต่ละชนิดที่ร้านค้าแต่ละแห่งเป็นแบบพลวัตภายในเวลาที่กำหนด การตัดสินใจสำหรับปัญหานี้ประกอบไปด้วยการระบุปริมาณการจัดส่งสำหรับสินค้าแต่ละชนิดไปยังแต่ละร้านค้าภายในช่วงเวลาทำการพิจารณา พร้อมทั้งตัดสินใจในเรื่องเส้นทางการจัดส่ง เพื่อให้มีต้นทุนโดยรวมของการจัดเก็บพัสดุคงคลังและการจัดส่งน้อยที่สุดภายใต้เวลาที่ทำการพิจารณา สำหรับวิธีการหาคำตอบ วิทยานิพนธ์ฉบับนี้ได้ใช้แนวคิดในการแบ่งปัญหาออกเป็นปัญหาย่อย ซึ่งแต่ละปัญหาย่อยนั้นจะถูกพิจารณาเป็นปัญหาการกำหนดปริมาณการสั่งซื้อที่มีค่าสั่งซื้อแบบไม่ตายตัวสำหรับแต่ละชนิดสินค้าในร้านค้า หรือกลุ่มของชนิดสินค้าในร้านค้า ทั้งนี้วิทยานิพนธ์ฉบับนี้ได้นำเสนอวิธีการหาคำตอบทั้งหมด 3 แนวทาง คือ SIOH AIOOH และ AIOVH และทำการทดสอบความสามารถของกระบวนการหาคำตอบโดยทำการทดลองเปรียบเทียบกับคำตอบจาก CPLEX 8.0 ในปัญหาขนาดเล็กและกับวิธีการจัดส่งแบบที่กำหนดปริมาณการจัดส่งตามความต้องการในปัญหาขนาดกลางและใหญ่ ซึ่งผลปรากฏว่าวิธีการที่นำเสนอสามารถหาคำตอบได้โดยสามารถพบคำตอบที่ดีที่สุด (optimal solution) ในปัญหาขนาดเล็ก และในปัญหาขนาดกลางและใหญ่ ฮิวริสติก AIOOH และ AIOVH เป็นฮิวริสติกที่สามารถแก้ปัญหาได้ดี โดยมีคำตอบที่ดีกว่าวิธีการที่นำมาเปรียบเทียบโดยเฉลี่ยร้อยละ 15 ถึงร้อยละ 25 ซึ่งเป็นระดับที่น่าพึงพอใจ

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ปีการศึกษา 2551

ลายมือชื่อนิติ ๑๕๐๐๕ ๒๕๐๑๑๑๑

ลายมือชื่อ.ที่ปรึกษาวิทยานิพนธ์หลัก ปวีณา เชาวลิตรวงศ์

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CHAYATHUCH PHUAKSAMAN : A MULTI-ITEM MULTI-DEPOT
INVENTORY ROUTING PROBLEM. ADVISOR : ASST. PROF.
PAVEENA CHAOVALITWONGSE, Ph.D., 130 pp.

This thesis studies a multi-retailer multi-depot distribution system with multi-item. In this system, the products must be spread from a group of depot to several retailers in a finite time horizon. Shipments from the depots to retailers are made by a set of homogeneous vehicle with limited carrying capacity. Customer demand of items at each retailer is dynamic with time period. Decisions in this system include replenishment quantities of each item at each retailer during considered periods and its corresponding delivery route with minimum total inventory and routing cost during considered time horizon. For the solution, this dissertation uses the concept of problem decomposition by decomposing the main problem into many sub problems. Each sub problem is the lot-sizing problem for an item in an outlet or a set of items in outlets. The lot-sizing problem considered in this dissertation differs from the basic lot-sizing problem in which the setup cost is dynamic. The setup costs are provided by the calculation of the difference on route cost. Three heuristic algorithms, SIOH, AIOOH and AIOVH, are proposed to solve this complicated problem. The performances of the heuristics are tested by comparing to solution obtained by CPLEX 8.0 for small-sized problem and Lot-for-Lot policy for medium and large-sized problem. The computational results show that the proposed heuristics can achieve the optimal solution in small-sized problem. Moreover the heuristics AIOOH and AIOVH show improvement from Lot-for-Lot policy between 15-25% in average for the medium and large-sized problem.

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