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VEHICLE ROUTING PROBLEM: MODELS AND SOLUTIONS

(Masalah Perjalanan Kenderaan: Model dan Penyelesaian)

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ABSTRACT

The Vehicle Routing Problem (VRP) is a well known problem in operational research where customers of known demands are supplied by one or several depots. The objective is to find a set of delivery routes satisfying some requirements or constraints and giving minimal total cost. The VRP has drawn enormous interests from many researchers during the last decades because of its vital role in planning of distribution systems and logistics in many sectors such as garbage collection, mail delivery, snow ploughing and task sequencing. The VRP is divided into many types. The important problems are VRP with Time Windows, VRP with Pick-Up and Delivery and Capacitated VRP. Recently many exact methods have been used to solve the VRP such as exact algorithms based on linear programming techniques and guided local search. Besides that, heuristic techniques have received wide interests in researchers' effort to solve large scale VRPs. Among the recently applied heuristic techniques are genetic algorithm, evolution strategies and neural networks.

Keywords: Vehicle routing problem; VRP with time windows; VRP with pick-up and delivery; capacitated VRP; exact algorithms; heuristic methods

ABSTRAK

Masalah perjalanan kenderaan (MPK) merupakan suatu masalah yang terkenal dalam penyelidikan operasi yang para pelanggan dengan permintaan tertentu disalurkan keperluannya dari satu atau beberapa depot. Objektifnya adalah untuk mencari suatu set perjalanan yang memenuhi keperluan atau kekangan tertentu dengan jumlah kos yang minimum. MPK telah menarik perhatian ramai penyelidik dalam beberapa dekad yang lalu kerana peranan pentingannya dalam perancangan sistem pengedaran dan logistic dalam banyak sector seperti pengutipan sampah-sarap, penyerahan mel, penenggalaan salji dan penjadualan kerja. MPK terbahagi kepada banyak jenis. Antara yang penting adalah MPK dengan Tetingkap Masa, MPK dengan Pengambilan dan Penghantaran, dan MPK dengan Kapasiti. Kebelakangan ini banyak kaedah tepat telah diguna untuk menyelesaikan MPK seperti kaedah berasaskan teknik pengaturcaraan linear dan carian setempat berpandu. Di samping itu kaedah heuristik pula telah menambat minat ramai penyelidik untuk menyelesaikan masalah MPK berskala besar. Antara kaedah heuristik yang digunakan kebelakangan ini adalah al-Khwarizmi genetik, strategi evolusi dan rangkaian neural.

Kata kunci: Masalah perjalanan kenderaan; MPK dengan tetingkap masa; MPK dengan pengambilan dan penghantaran; MPK dengan kapasiti; kaedah tepat; kaedah heuristik

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