

# The Vehicle Routing Problem with Service Level Constraints

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**Abstract.** We consider a vehicle routing problem which seeks to minimize cost subject to service level constraints on several groups of deliveries. This problem captures some essential challenges faced by a logistics provider which operates transportation services for a limited number of partners and should respect contractual obligations on service levels. The problem also generalizes several important classes of vehicle routing problems with profits. To solve it, we propose a compact mathematical formulation, a branch-and-price algorithm, and a hybrid genetic algorithm with population management, which relies on problem-tailored solution representation, crossover and local search operators, as well as an adaptive penalization mechanism establishing a good balance between service levels and costs. Our computational experiments show that the proposed heuristic returns very high-quality solutions for this difficult problem, matches all optimal solutions found for small and medium-scale benchmark instances, and improves upon existing algorithms for two important special cases: the vehicle routing problem with private fleet and common carrier, and the capacitated profitable tour problem. The branch-and-price algorithm also produces new optimal solutions for all three problems.

**Keywords.** Routing, collaborative logistics, service level constraints, integer programming, genetic algorithms.

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product made within the last 6 months. · 2. Review storage ... UNDERSTANDING VULNERABILITY ASSESSMENT Table 6 provides examples of PRNs for different raw materials. Table 6 Priority ... Mass balance exercises at critical points in the supply chain - the mass ... ISSUE 8 FOOD SAFETY - Frequently Asked Questions - a worked example from the raw material supplier, which ... to conduct a mass balance test every 6 months for each claim or a single mass balance test every. Yamaha TDM900 Service Manual 2002 2004 manuale di ... Manuale di assistenza per moto per l elemento a Yamaha TDM900 Service Manual 2002 2004, gratis! Yamaha TDM 900 Service Manual | PDF | Throttle Remove: S fuel tank Refer to FUEL TANK. S air filter case Refer to AIR FILTER CASE. 3. Adjust: S throttle cable free play NOTE: When the throttle is opened, the ... Yamaha Tdm 900 2002 2005 Manuale Servizio Rip Apr 25, 2013 — Read Yamaha Tdm 900 2002 2005 Manuale Servizio Rip by Nickie Frith on Issuu and browse thousands of other publications on our platform. Manuale Officina ITA Yamaha TDM 900 2002 al 2014 Oct 8, 2023 — Manuale Officina ITA Yamaha TDM 900 2002 al 2014. Padova (PD). 12 €. T ... Scarica gratis l'App. Subito per Android · Subito per iOS. © 2023 ... Yamaha tdm 900 2001 2003 Manuale di riparazione Top 12 ricerche: ico scoalasoferigalat honda yamaha suzuki manual i aprilia manuale officina cmx 250 Virago 535 suzuki dr600 ford . Scegli la lingua: Rumeno. Manuali Kit montaggio GIVI x TDM850 · Kit montaggio GIVI x TDM900. Istruzioni per il montaggio di tutti i supporti GIVI per il TDM850 e 900 (PDF da 3 e da 6 Mb). MANUALE OFFICINA IN ITALIANO YAMAHA TDM 900 2002 Le migliori offerte per MANUALE OFFICINA IN ITALIANO YAMAHA TDM 900 2002 - 2014 sono su eBay □ Confronta prezzi e caratteristiche di prodotti nuovi e usati ... Yamaha TDM850'99 4TX-AE3 Service Manual View and Download Yamaha TDM850'99 4TX-AE3 service manual online. TDM850'99 4TX-AE3 motorcycle pdf manual download. Also for: Tdm850 1999.