

EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

A New Approach for Vehicle Routing with Stochastic Demand: Combining Route Assignment with Process Flexibility

ABSTRACT – We propose a new approach for the vehicle routing problem with stochastic customer demands revealed before vehicles are dispatched. We combine ideas from vehicle routing and manufacturing process flexibility to propose overlapped routing strategies with customer sharing. We characterize the asymptotic performance of the overlapped routing strategies under probabilistic analysis while also providing an upper-bound on the asymptotic performance that depends only on the mean and standard deviation of the customer demand distribution. Moreover, we show the optimality gap of our approach decays exponentially as the size of overlapped routes increases. We demonstrate that our overlapped routing strategies perform close to the theoretical lower-bound derived from the reoptimization strategy, and significantly outperform the routing strategy without overlapped routes. The effectiveness of the proposed overlapped routing strategies in non-asymptotic regimes is further verified through numerical analysis. Finally, several ongoing extensions will be discussed.



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SPEAKER BIO – Hanzhang Qin is currently a postdoctoral scientist at Amazon affiliated with the Supply Chain Optimization Technologies group. He received his Ph.D. degree in Computational Science and Engineering and two master's degrees in EECS and transportation from MIT. Hanzhang has research interests that span stochastic control, applied probability and statistical learning, with applications in supply chain analytics and transportation systems. Prior to attending MIT, Hanzhang received two bachelor degrees in Industrial Engineering and Mathematics from Tsinghua University.

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3:30 PM – 4:50 PM

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