



SEMINAR

Service level requirements in real-life-sized bike sharing systems

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Bicycle Sharing Systems (BSS) are vital to urban transportation networks, presenting complex optimization challenges. One such challenge is managing service levels for large-scale BSS, where the aim is to strategically redistribute bicycles across stations to anticipate fluctuating demand for origin-destination trips. While numerous studies tackle this issue, none, to our knowledge, have effectively handled real-life-sized BSS comprising thousands of stations, tens of thousands of bicycles, and hundreds of thousands of daily trips.

We propose a two-step approach. First, we determine next morning service requirements by formulating and solving stochastic programs to compute the bicycle quantities at each station. Second, we design vehicle routes to satisfy as many of these bicycle quantities as possible.

Computational experiments utilize data from major BSS in Boston, Montréal, New York, and Washington D.C. Our results demonstrate efficient problem-solving with solutions closely approaching optimality. Additionally, we offer managerial insights into bicycle and station usage within BSS, facilitating better operational strategies.