Recent advances in autonomous vehicles (AVs) will soon transform car-sharing system paradigm. It is expected Autonomous Car-Sharing Systems (ACSS) will serve more trips than current peer-to-peer ridesharing or taxi systems. However, fully relying on ACSS may not always be beneficial for both the service operators and the overall transportation systems due to fleet cost and relocation requirements. This talk will present a time-space optimization model for service design and operations of future ACSSs that determines the optimal fleet size, service level, and vehicle operations. The proposed model explicitly considers empty vehicle relocation and the demand shift between ACCS and privately owned AVs. We develop methodologies based on Benders decomposition to handle the computational challenges.

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