

Minimizing congestion in supermarkets with queuing networks

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Reducing congestion inside stores (e.g., supermarkets) is of great interest to many retailers; congestion affects customer experience, and may delay the fulfillment of online orders. We model stores as planar graphs in which nodes represent zones, and edges connect the nodes of neighboring zones. Customers traverse through the graph via the edges, and they queue to be served at each node. Once they have been served, they visit the next node. This approach allows us to apply standard results from queuing theory to find queue sizes and other quantities of interest.

Our results suggest that queuing networks can be used successfully to give insight for the design of better stores. We also investigate features of ‘optimal networks’ and compare these with random-graph models.