

Routing in Graphs with Applications to Material Flow Problems

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Material flow problems are complex logistic optimization problems. We want to utilize the available logistic network in such a way that the load is minimized or the throughput is maximized. This lecture deals with these optimization problems from the viewpoint of network flow theory and reports on two industrial applications: (1) controlling material flow with automated guided vehicles in a container terminal (cooperation with HHLA), and (2) timetabling in public transport (cooperation with Deutsche Bahn and Berlin Public Transport). The key ingredient for (1) is a very fast real-time algorithm which avoids collisions, deadlocks, and other conflicts already at route computation, while for (2) it is the use of integer programs based on special bases of the cycle space of the routing graph.

References

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