

# Analysis and Optimization of Transport Systems

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Strictly evolutionary approaches to improving the air transport system—a highly complex network of interacting systems—no longer suffice in the face of demand that is expected to double or triple by 2025. It is necessary to arrive at active design methods. The ability to actively design, optimize and control a system presupposes the existence of predictive modeling and reasonably well-defined functional dependences among the controllable variables of the system and objective and constraint functions for optimization. We investigate functional relationships that govern the performance of transport networks; for example, the links between the first nontrivial eigenvalue of a network's Laplacian matrix—a quantitative measure of network synchronizability—and other global network characteristics with the aim of arriving at substantiated modeling, design, and control methods.