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Optimization-based Solutions to Constrained Trajectory-tracking and Path-following Problems

By Timm Faulwasser

Shaker Verlag Feb 2013, 2013. Buch. Book Condition: Neu. 21x14.8x cm. Neuware - Systems and control theory is of great importance for the analysis, the design, and the operation of complex dynamical systems. The prototypical problem in control theory is the stabilization of a set point. This is the problem of designing a feedback such that the closed-loop solutions stay in a neighborhood of the set point and converge to it. When, instead of a set point, a time-varying reference needs to be stabilized-i.e., the closed-loop solutions shall converge to a time-varying reference trajectory-then the problem is called trajectory tracking. Typical examples of trajectory-tracking problems are set point changes along precomputed references, synchronization tasks or startup of processes. While stabilization and trajectory tracking are well-understood for a wide range of systems, not all control tasks arising in practise belong to these categories. For example, consider the case of steering a car automatically along a road. Usually, the driving velocity is not predetermined. The only requirements are to keep the car on the road while driving sufficiently fast. Formally, we can reformulate this task as follows: the system state or output should converge to a known geometric curve and follow it..



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