

# OPTIMAL CONTROL FOR SYSTEMS WITH ORDER 1 STATE SPACE CONSTRAINTS

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In this series of lectures I will consider single-input optimal control problems with state space constraints that have strong geometric properties, more specifically, are given by codimension 1 integral submanifolds of an admissible control for the problem. This geometric structure is used to construct a local embedding of a boundary arc into a field of extremals and prove the strong local optimality of the trajectories in this field.

The emphasis is on a general approach to sufficient conditions for optimality derived through geometric constructions (regular synthesis, method of characteristics). An important step is making the connections between stronger necessary conditions for optimality that hold because of the geometric properties of the constraints and conditions that enable the construction. The results are motivated by and illustrated with a realistic problem in electronics.