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Minmax control problems and the Hamilton-Jacobi Equation

We look at minmax optimal control problems where both the cost and the associated dynamics are dependent on parameters that are contained in a nonempty compact metric space $\mathcal{A}$. The optimization is taken over the worst case scenario with the parameters varying in the set $\mathcal{A}$. We provide optimality conditions via Hamilton-Jacobi theory. The methodology employed is by first providing the optimality conditions for problems with finite sets $\mathcal{A}$ and then approximating the infinite abstract set by increasingly finite sets and proving the convergence of the optimality conditions derived for problems posed with finite sets to general minmax problems with abstract compact metric spaces $\mathcal{A}$.