

OPTIMALITY CONDITIONS FOR TOTAL-COST PARTIALLY OBSERVABLE MARKOV DECISION PROCESSES WITH GENERAL STATE AND ACTION SPACES

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This talk describes sufficient conditions for the existence of optimal policies for Partially Observable Markov Decision Processes (POMDPs) with general state and action spaces. The objective criterion is either minimization of the expected total discounted costs or minimization of the expected total nonnegative costs. It is well-known that a POMDP can be reduced to a Completely Observable Markov Decision Process (COMDP) with the state space being the sets of belief probabilities for the POMDP. Thus, a policy is optimal in POMDP if and only if it corresponds to an optimal policy in the COMDP. Here we provide sufficient conditions for the existence of optimal policies for COMDPs and therefore for POMDPs. We also derive optimality equations and convergence of value iterations for COMDPs.