

國立中央大學機率演講

National Central University
Department of Mathematics
Probability Seminar

題目：Convergence of Policy Improvement for Entropy-Regularized Stochastic Control Problems

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地點：國立中央大學鴻經館 M107

Abstract

For a general entropy-regularized stochastic control problem on an infinite horizon, we prove that a policy improvement algorithm (PIA) converges to an optimal relaxed control. Contrary to the standard stochastic control literature, classical Hölder estimates of value functions do not ensure the convergence of the PIA, due to the added entropy-regularizing term. To circumvent this, we carry out a delicate estimation by moving back and forth between appropriate Hölder and Sobolev spaces. This requires new Sobolev estimates designed specifically for the purpose of policy improvement and a nontrivial technique to contain the entropy growth. Ultimately, we obtain a uniform Hölder bound for the sequence of value functions generated by the PIA, thereby achieving the desired convergence result. Characterization of the optimal value function as the unique solution to an exploratory Hamilton-Jacobi-Bellman equation comes as a by-product.

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