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Adaptive Control for Discrete-Time Markov Processes with Unbounded Costs: Discounted Criterion.

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Abstract: We study the adaptive control problem for discrete-time Markov control processes with Borel state and action spaces and possibly unbounded one-stage costs. The processes are given by recurrent equations $x_{t+1} = F(x_t, a_t, \xi_t)$, $t = 0, 1, \ldots$ with i.i.d. $\Re^k$-valued random vectors ξ_t whose density ρ is unknown. Assuming observability of ξ_t we propose the procedure of statistical estimation of ρ that allows us to prove discounted asymptotic optimality of two types of adaptive policies used early for the processes with bounded costs.

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