

1014-93-283

Onésimo Hernández-Lerma* (ohernand@math.cinvestav.mx), Mathematics Depart,
CINVESTAV-IPN, A. Postal 14-740, Mexico D.F. 07000, Mexico. *Weakly overtaking optimal
strategies for controlled diffusion processes.* Preliminary report.

We consider \mathbb{R}^n -valued controlled diffusion processes of the form $dx_t = b(x_t, u_t)dt + \sigma(x_t)dw_t$, $t \geq 0$, with *Markov control strategies* $u_t \equiv \mathbf{u}(t, x_t)$ for suitable functions $\mathbf{u} : [0, \infty) \times \mathbb{R}^n \rightarrow U$, where $U \subset \mathbb{R}^m$ is the *control set*. Let r be a given real-valued reward rate function on $\mathbb{R}^n \times U$, and for each Markov strategy \mathbf{u} and initial state $x_0 = x$ let $J_T(\mathbf{u}, x) := E_x^{\mathbf{u}} \left[\int_0^T r(x_t, u_t) dt \right]$ be the expected total reward up to time $T > 0$. Let \mathcal{U} be a family of Markov strategies. A strategy $\mathbf{u}^* \in \mathcal{U}$ is said to be *weakly overtaking optimal in \mathcal{U}* if, for every $x \in \mathbb{R}^n$ and $\mathbf{u} \in \mathcal{U}$, $\liminf_{T \rightarrow \infty} [J_T(\mathbf{u}^*, x) - J_T(\mathbf{u}, x)] \geq 0$. In this paper we give conditions ensuring the *existence*, as well as several *characterizations*, of weakly overtaking optimal strategies. Our work extends previous results on controlled diffusion processes, and controlled Markov chains. (Received September 06, 2005)