Importance sampling in the neighborhood of a stable equilibrium point

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We discuss the construction of importance sampling schemes for the estimation of escape probabilities of small noise diffusions before a given time. The principal novel feature and source of much of the difficulty is that the domain includes an equilibrium point of the noiseless dynamics. In particular, when equilibrium points are present and the time interval is large a new exponential scaling is introduced. We describe how one can combine subsolutions for an associated Bellman equation with a local construction is based on the linear-quadratic regulator to construct schemes that perform well uniformly for large time.