Large deviations for diffusions: Donsker and Varadhan meet Freidlin and Wentzell

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Abstract. We consider a diffusion process on $\mathbb{R}^n$ and prove a large deviation principle for the empirical process in the joint limit in which the time window diverges and the noise vanishes. The corresponding rate function is given by the expectation of the Freidlin-Wentzell functional per unit of time. As an application of this result, we obtain a variational representation of the rate function for the Gallavotti-Cohen observable in the small noise and large time limits.

Keywords. Large deviations, empirical process, Γ-convergence, Gallavotti-Cohen observable.