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MOUVEMENTS BROWNIENS ASYMÉTRTQUES MODIFIÉS EN DIMENSION FINIE ET OPÉRATEURS DIFFÉRENTIELS À COEFFICIENTS DISCONTINUS

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Abstract: We consider a partial differential equation of parabolic type on $\mathcal{E} = R^d$ $(d \in N_*)$,

$$\begin{aligned} \frac{\partial u}{\partial t}(x,t) &= Lu(x,t), \quad x \in \mathcal{E}, t \in R_+, \\ u(x,0) &= f(x), \quad u(\cdot,t)/\partial\mathcal{E} = 0 \end{aligned} \tag{1}$$

where $L = (C1_{\mathcal{V}} + D1_{\mathcal{W}})\Delta + \delta_{\mathcal{S}} A\nabla$, $\mathcal{V}$ and $\mathcal{W}$ being two subdomains of $\mathcal{E}$ such that $\mathcal{E} = \mathcal{V} \cup \mathcal{W} \cup \mathcal{S}$, $\mathcal{V} \cap \mathcal{W} \neq \emptyset$ and $\mathcal{S}$ being a $\mathcal{C}^2$-variety. The functions C and D are $\mathcal{C}^2$ on $\mathcal{E}$, δy is the surface-vector-measure on $\mathcal{S}$, A is a function defined on $\mathcal{S}$ which will be precised later on, $\delta_{\mathcal{S}} A$ is a generalized drift, ∇ [resp. $\triangle$] is the classical gradient [resp. Laplacian operator] on R^d.

We give, via a modified skew Brownian motion, a stochastic resolution of (1) - L being considered as a generalized infinitesimal generator - and we study the continuity properties of the transition probability densities and of their derivatives at the neighbourhood of $\mathcal{S}$.

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