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# TIME-INHOMOGENEOUS DIFFUSIONS CORRESPONDING TO SYMMETRIC DIVERGENCE FORM OPERATORS

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*Abstract:* We consider a time-inhomogeneous Markov family $(X, P_{s,x})$ corresponding to a symmetric uniformly elliptic divergence form operator. We show that for any $\varphi$ in the Sobolev space $W_p^1 \cap W_2^1$ with $p = 2$ if $d = 1$ and $p > d$ if $d > 1$ the additive functional $X^\varphi = \{\varphi(X_t) - \varphi(X_s); 0 \le s < t\}$ admits a unique strict decomposition into a martingale additive functional of finite energy and a continuous additive functional of zero energy. Moreover, we give a stochastic representation of the zero energy part and show that in case the diffusion coefficient is regular in time the functional $X^\varphi$ is a Dirichlet process for each starting point $(s, x)$. The paper contains also rectifications of incorrectly presented or incorrectly proved statements of our earlier paper [14].

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