1109-60-15 **Yaozhong Hu*** (yhu@ku.edu), Department of Mathematics, University of Kansas, Lawrence, KS 66045, and **Khoa Le** (k338l392@ku.edu), Department of Mathematics, University of Kansas, Lawrence, KS 66045. *Brox Diffusion and its stochastic differential equations.* Preliminary report.

This paper studies the weak and strong solutions to the stochastic differential equation $dX(t) = -\frac{1}{2}\dot{W}(X(t))dt + d\mathcal{B}(t)$, where $(\mathcal{B}(t), t \geq 0)$ is a standard Brownian motion and $W(x)$ is a two sided Brownian motion, independent of $\mathcal{B}$. It is shown that the Itô-McKean representation associated with any Brownian motion (independent of W) is a weak solution to the above equation. It is also shown that the Itô-McKean representation for an appropriately chosen Brownian motion is a strong solution to the equation. The uniqueness of the strong solution is also obtained. The main idea to deal with the singularity of drift term $\int_0^T \dot{W}(X(t))dt$ is to use the local time and to use the polygonal approximation W_π. Some new results on the local time of Brownian motion needed in our proof are established. (Received December 18, 2014)