Energy exchanges in a damped Langevin-like system with two thermal baths and an athermal reservoir

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We study a Langevin-like model which describes an inertial particle in a onedimensional harmonic potential and subjected to two heat baths and one athermal environment. The thermal noises are white and Gaussian, and the temperatures of heat reservoirs are different. The athermal medium act through an external non-Gaussian noise of Poisson type. We calculate exactly the timedependent cumulant-generating function of position and velocity of the particle, as well as an expression of this generating function for stationary states. We discuss the long-time behavior of first cumulants of the energy injected by the athermal reservoir and the heat exchanged with thermal baths. In particular, we find that the covariance of stochastic heat due to distinct thermal reservoirs exhibits a complex dependence on properties of athermal noise.