Stochastic perturbations of the swinging spring model

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We use a swinging spring as an analogue for balanced flow as it has both slow, swinging modes of oscillation and fast, compressional modes of oscillation. It can be said that the swinging spring motion for certain values of the parameters corresponds to geostrophic balanced flow for small Rossby numbers, and the slow oscillations correspond to low-frequency Rossby waves. Ways of adding a stochastic perturbation to the system are explored, with reference to how they will affect the geometric structure on the solution curves and the conservation of energy and momentum, and the use of an integrator that will take advantage of the geometric properties of the perturbed system is considered.