

## **Rate-bias-dependent hysteresis modeling of a magnetostrictive transducer**

### **Abstract**

We suggest a new hysteresis model that can describe rate and bias effects of the harmonic magnetic fields on hysteresis nonlinearities of a magnetostrictive actuator. The proposed model is constructed using the generalized rate-dependent Prandtl-Ishlinskii model that incorporates a rate-bias-dependent threshold and a memoryless functions. The results show that the proposed model can characterize the asymmetric hysteresis effects under different levels of input magnetic bias which are applied at different excitation frequencies. © 2015 Springer-Verlag Berlin Heidelberg