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Estimate of the Damping Force Exponential Coefficient for an Oscillating Beam S. RAY BULLOCK[1], W. EUGENE COLLINS[1], The Center of Physics and Chemistry of Materials, Fisk University, RONALD E. MICKENS[2], Physics Department, Clark Atlanta University — For many dynamic systems damping/dissipative forces (DDF) are important. These forces are generally modeled in the equations of motion by terms linear in the "velocity." An example is the standard damped, linear harmonic oscillator. However, for complex systems a broader range of functional forms is required for the associated DDF. If the fact that such systems only oscillate in a finite number of cycles is taken into account, then the leading term of the DDF is proportional to v^{α}, where α lies in the interval $(0, 1)$. We present preliminary experimental results, for a vibrating beam, implying that $\alpha \sim 0.9$. To obtain this value we derive a theoretical relationship between the damping time and the "initial amplitude" of the beam, a relationship which does not depend on knowing *a priori* the exact equations of motion. Our findings are relevant for the study and analysis of vibrations in carbon nano-tubes and graphene sheets.

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Ronald Mickens
Clark Atlanta University

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