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Modeling the Bowed Violin to Effectively Produce an Accurate Violin Sound Using Mathematical and Physical Analysis.

The equation for the energy of a wavelength for a violin bow is complicated than the energy of a wavelength composed of a single frequency. Through Fourier Analysis however, one can accurately calculate the exact power necessary to successfully produce a complex violin wave, by breaking it down into its constituent simple frequencies. In this paper, a more formal explanation of this proof was presented after a relevant strategy and program were set up determining the Fourier series that can be used to represent a bowed violin. Since a note played on violin exponentially dampens in decibels until it no longer can be heard, the dampening of a wave composed of a Fourier series can be modeled as the series multiplied by exponential function. By analyzing the time it takes a wave to dampen to the point in which it's no longer audible, a dampening effect was inserted into the model of the bowed violin to effectively produce an accurate violin sound. (Received August 30, 2016)