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### Final Project

As a final project for the class, I am interested in studying the physics of bowed instruments. There is a section on this topic on *Computational Physics* (by Nicholas J. Giordano and Hisao Nakanishi) which caught my interest. An interesting project would be to investigate the string displacement for different 'bow forces'. To study this, a variation of the Euler method can be used, taking into account the 'slip-stick' force acting on the string. We can try to determine the force that will yield a 'nice' sound using different parameters like the string length, coefficients of friction, velocity of the bow, etc...

When taking music lessons, it is common to see a teacher suggesting his students to apply more force to the string, while on the other hand, some will argue that increasing the velocity of the bow is the main factor in producing a nice sound. We can perform plots of string displacement vs. force (at fixed velocity) and string displacement vs. velocity (at fixed force) to determine which is the most influential factor.

### References:

*Giordano, Nicholas J. Computational Physics. Upper Saddle River, NJ: Prentice Hall, 1997. Print.*

*Guettler, K., E. Schoonderwaldt, and A. Askenfelt. "Bow Speed or Bowing Position— Which One Influences Spectrum The Most?" Proceedings of the Stockholm Music Acoustics Conference, August 6-9, 2003 (SMAC 03), Stockholm, Sweden (2003): n. pag. Web.*