Gene Wang

Dr. Nelson

ATCS: Numerical Methods Period 7

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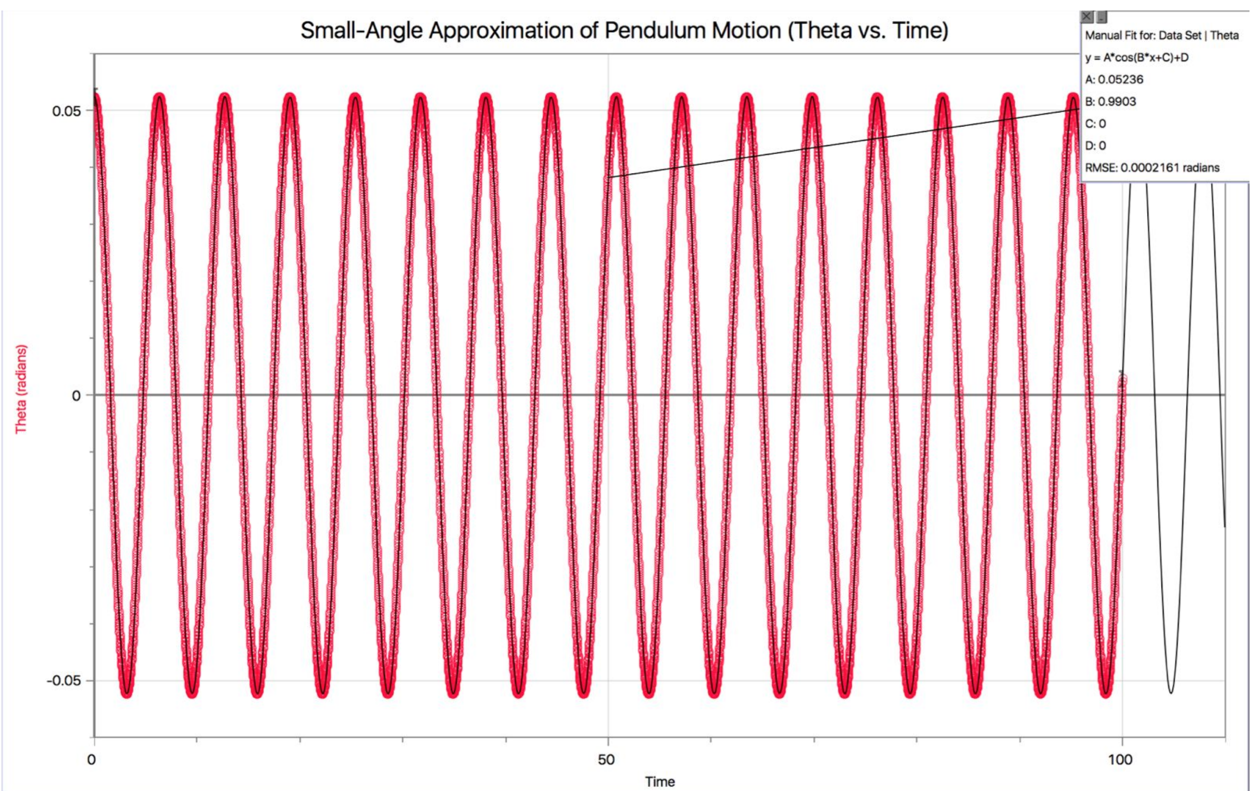
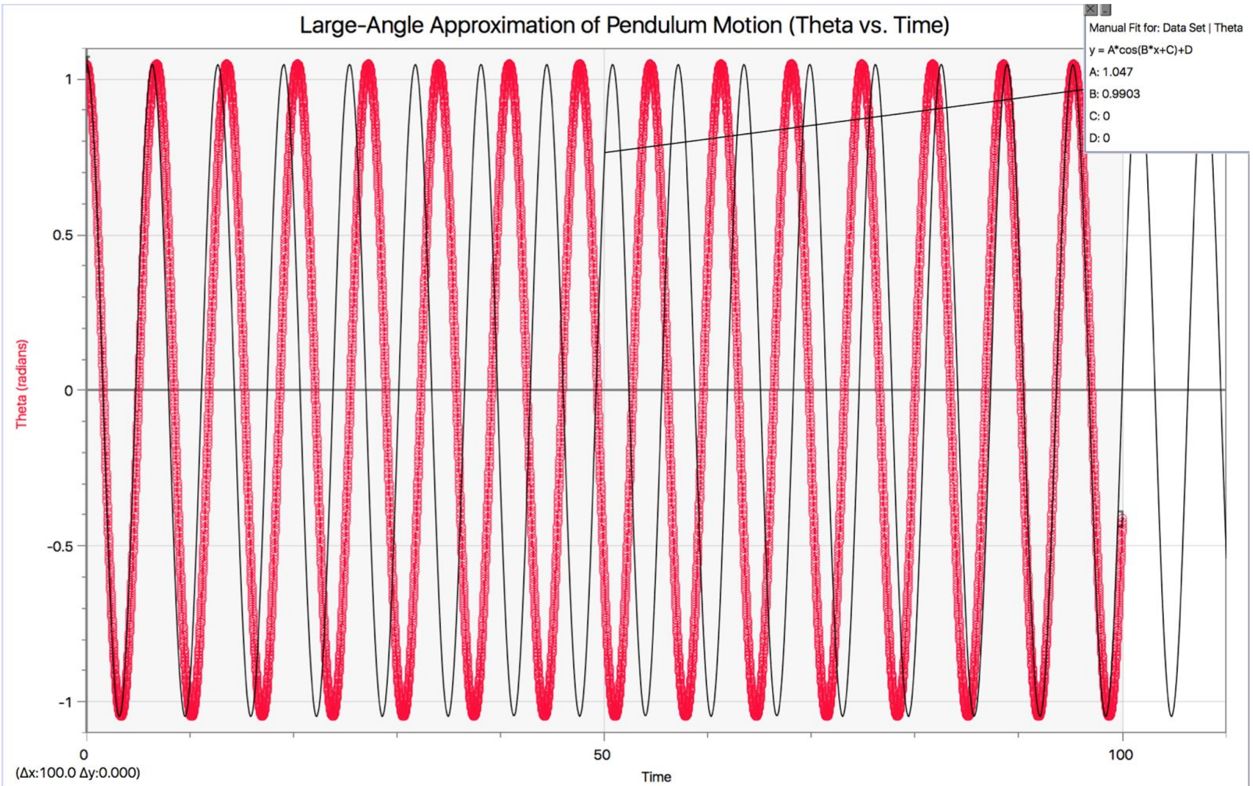
Simple Pendulum Motion Modeled Using Differential Equations

Values Used:

- Initial Angular Velocity = 0
- g = 9.80665
- l = 10
- $\Delta t = 0.01$



Here is a plot of the model of pendulum motion using a small initial angle of 3º along with a plot of a closed form small angle solution of theta = A cos(g/L t + phase). We can see that with a small initial angle, the closed form solution fits beautifully across multiple periods.



Here is a plot of the model of pendulum motion using a relatively large initial angle of 60º along with a plot of a closed form small angle solution of theta = A cos(g/L t + phase). We can see that with a large initial angle, the closed form solution fits beautifully for the first period, then is more and more inaccurate as time goes on.