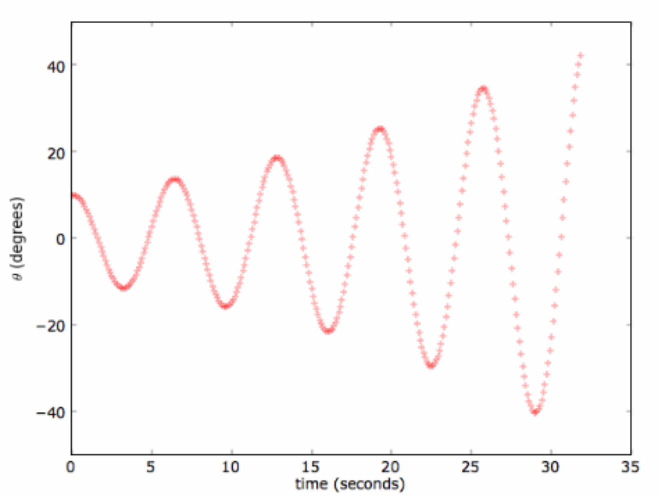
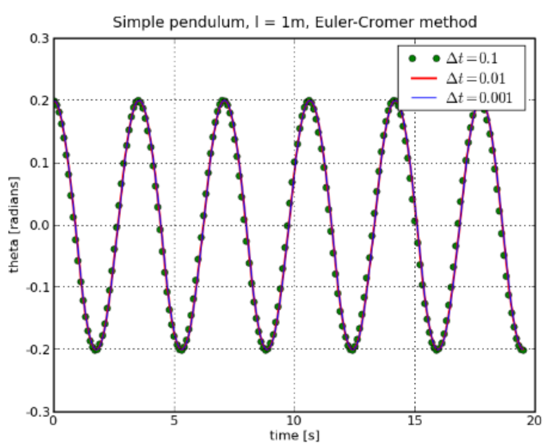
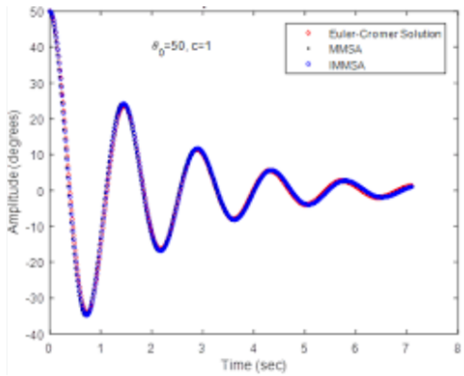
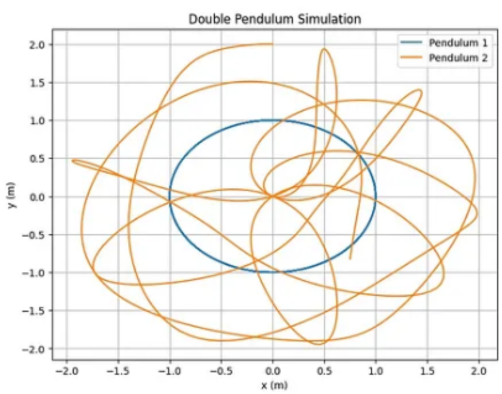
- The perpendicular force through a string in a basic pendulum SHO is given by:
- $F_{\theta} = -mgsin(\theta)$
- Angular velocity of the pendulum: $\omega_{i+1} = \omega_{i} - \frac{g}{l}\theta_{i}\Delta t$, $\theta_{i+1} = \theta_{i} + \omega\Delta t$
- A lower Δt makes the errors in a Euler approximation system smaller.
- 

Graph similar to the example in the book which was used to graphically describe an Euler approximation of a SHO system.
- Total Energy of the pendulum: $E = 1/2\, ml^{2}\omega^{2} + mgl(1 - cos(\theta))$
- The Euler-Cromer method of approximation takes a different approach to the same method as the Euler method and in SHO problems tends to better conserve energy.
- 

Graph similar to the example in the book which was used to graphically describe an Euler-Cromer approximation of a SHO system.

- 

Graph similar to the example in the book which was used to graphically describe an Euler-Cromer approximation of a damped pendulum system.
- Underdamped system: $\theta(t) \ = \ \theta_0 e^{-qt/2} sin(\sqrt{\Omega^2 - q^2/4t \ + \ \phi})$
- Overdamped system: $\theta(t) \ = \ \theta_0 e^{-q/2 \pm sin(\sqrt{q^2/4 - \Omega^2})t}$
- Critically: $\theta(t) \ = \ (\theta_0 \ + \ Ct)e^{-qt/2}$
- Chaotic behavior in a pendulum has to do with the driving force in the pendulum.
- Examples of chaotic behavior in pendulums:
- 

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