Using MATLAB and Programming to Simulate Dynamical Systems
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Computation

1 + 2 = 3

\[
\begin{bmatrix}
1 & 2 \\
3 & 4
\end{bmatrix}
\begin{bmatrix}
1 & 2 \\
3 & 4
\end{bmatrix} =
\begin{bmatrix}
7 & 10 \\
15 & 22
\end{bmatrix}
\]

Programming

X = 0

X = X + 0.1

X + 3 < 0.1

Output x

No

Yes
Modeling Bouncing Ball with Nonlinear Air Drag

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Tower of Hanoi
ODE and Simulating Dynamics Numerically
Simulating Dynamics of Mechanical Systems

\[ F = F_0 \cdot \sin(wt) \]

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Simulating Dynamics of Nonlinear Systems

Choice of projects: (1) pendulum with elastic spring, (2) Population dynamics for wolfs and rabbits, (3) ?
MATLAB Programming – Eigenvalue Problems and Mechanical Vibration

\[ A \cdot x = \lambda x \quad (A - \lambda I) \cdot x = 0 \]

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Modeling the Swinging of a Building in the Wind