Homework For Mathematica Workshop

Organized by

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1. Create a list (10x10) of random numbers
   (a) Express the output in traditional form
   (b) Extract the first 10 random numbers
   (c) Extract the last number in the list
2. Find the dot product of the vector $\vec{a}$ and $\vec{b}$, where $\vec{a} = 2i+7j+15k$ and $\vec{b} = \alpha i+\beta j+\gamma k$
3. Define two 3x3 matrices using the function Table
   (a) Find the product of matrices
   (b) Find the inverse of the resultant matrix
   (c) Find the determinant and eigenvalues of the matrix
4. Solve the following diffrential equations
   (a) $\frac{d^2y}{dx^2} = 2x + y + \frac{dy}{dx}$ with $y(2) = 1$ and $y'(2) = -1$
   (b) $\frac{d^2y}{dx^2} + \text{Sin}^2(x)\frac{dy}{dx} + 3y^2 = e^{-x^2}$ with $y(0) = 1$ and $y'(0) = 0$
   (c) Plot the solutions