Comp. Anal. of Phys. Sys.

Quiz 8

A matrix **M** is called "*nilpotent*" if for a positive integer number p, $\mathbf{M^p}$ is the zero matrix (zero matrix is the matrix whose all elements are zero). Write a code to do:

Main program:

- Ask the user to enter **a 3x3 matrix** element by element.
- Ask the user to enter **the maximum number of tries for nilpotency (n)**.
- Send the matrix and the maximum number of tries to the function "**nilpo**"
- Write **p** to the screen. If the result is "**-1**", write "**No nilpotency for this n**"

Function "**nilpo**":

- Inputs: A **3x3 matrix**, an integer **n**
- Begin with **p=2** (i.e. the square of the matrix) and send the matrix and the number **p** to the function "**matrixpower**".
- Send the result came from the function "**matrixpower**" to the function "**checkzero**" to check if it is a zero matrix.
- If the result is **not** a zero matrix take **p=3**, then **p=4**, and so on and call the "**matrixpower**" again for these **p** values.
- If the result came from the function "**matrixpower**" is a zero matrix send the main program the number **p**.
- If the result came from the function "**matrixpower**" is not a zero matrix when **p=n**, send the main program "**-1**".

Function "**matrixpower**"

- Inputs: A **3x3 matrix**, an integer **p**
- Multiply a 3x3 matrix p times by itself. (Take the p^{th} power of the matrix.)
- Output: The result matrix

Function "**checkzero**"

- Input: A **3x3 matrix**
- Check if the input matrix is a zero matrix. (If an element is **less than 10^{-6}** regard this element as zero.)
- Output: Send **1** if the input matrix is a zero matrix, send **0** if it is not.
