ME 793 - Assignment 1

Department of Mechanical Engineering, IIT Bombay

Spring 2022

Due Date: 10:30 AM, Jan 20, 2022, Marks 25

Assignment Date: 11:00 PM, Monday, Jan 12, 2022

Objective and Instructions

1. The objective is to understand errors associated with calculation of $\mathbf{A}^{-1}$ by using various libraries.
2. Show all the elementary steps as needed to fully understand the problem.
3. This needs to be performed using Google Colab Notebook or Jupyter Notebook only.
4. For Assignment 1 you will have to solve using MATLAB and Python both and thus Jupyter notebook alone will not be sufficient. The final comparison and related plots can be made in Jupyter Notebook itself. Total 4 files should be uploaded - MATLAB script, MATLAB script PDF, Jupyter notebook, Jupyter Notebook PDF.
5. You are *welcome and are encouraged to discuss* with the students of this class.

Q 1. Create random matrices $\mathbf{A} \in \mathbb{R}^{n \times n}$ where $n = 5, 6, 7, 8, 9, 10$.

- Try two different solvers MATLAB or GNU OCTAVE and from Python, and determine $\mathbf{A}^{-1}$ for each n [12 marks].
- And also determine computation time for each [3 marks].
- Report your observations with reasoning [5 marks].
- Use *Frobenius norm* for comparing various solutions and report comparison using a $X - Y$ plot. [5 marks]

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