Homework 2: Krylov Methods
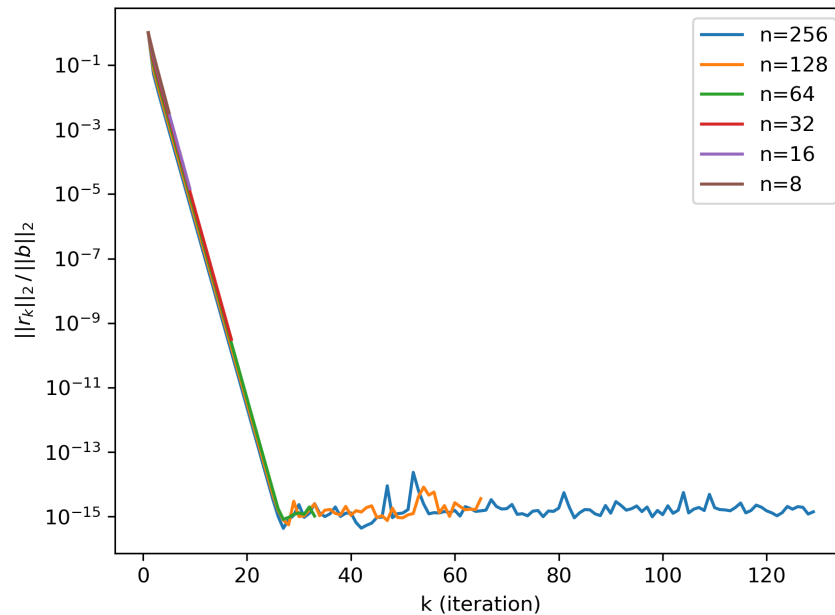
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Structure

2.1

2.2

For the serial implementation of GMRES in python I chose to follow Algorithm 6.9 from *Iterative Methods for Sparse Linear Systems by Yousef Saad*. For solving the minimization problem in line 12 I used a least squares solver taken form the numpy library.

Figure shows for $n = 8, 16, 32, 64, 128, 256$ the serial gmres function run for $m = n/2$ iterations. In this plot we can see that residual of the

$$\frac{||r_k||_2}{||b||_2} \propto n^{-a}$$

2.3