Worksheet

Part 1. Complexity of solving a linear system

If solving a linear system of size 250×250 takes x seconds, how many seconds does it take to solve one of size 500×500?

Write a piece of code that prints this factor. Here are some pieces you'll need:

- The function `process_time()` returns the amount of CPU time spent in the current process. Taking differences of this can help you figure out the time spent on a task.

- `np.random.randn(250, 250)` returns a random 250×250 matrix

  `np.random.randn(250)` returns a random vector of length 250.

- `np.linalg.solve(A, b)` solves a linear system with matrix `A` and right-hand side vector `b`.

```
import numpy as np
from time import process_time
```

Part 2. Complexity of solving a linear system

Which of the following is roughly proportional to the time it takes to solve a linear system of size $n \times n$?

(A) n

(B) n^2

(C) n^3

(D) n^4

(E) $n \log n$