

Homework 0

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Problem 1

Item (a)

Method 1

$$(\mathbf{A}_{N \times N} \otimes \mathbf{B}_{N \times N})^{-1}$$

- Method 2

$$(\mathbf{A}_{N \times N})^{-1} \otimes (\mathbf{B}_{N \times N})^{-1}$$

for $n \in \{2, 4, 6, 8, 16, 32, 64\}$

Problem 2

(a) Method 1

$$(\mathbf{A}_{N \times N} \otimes \mathbf{B}_{N \times N})^{-1}$$

(b) Method 2

The script to perform Problem B with matrices $N \times N$ and kron product until K , with $N = 4$, and $K = 8$, results in a dimensional error, since it's required more RAM memory available.

```
Requested 4x16384x4x16384 (64.0GB) array exceeds maximum array size preference (19.8GB). This might cause MATLAB to become unresponsive.

Error in kron (line 35)
    K = reshape(A.*B, ma*mb, na*nb);

Error in problem1_itemb>b_method1 (line 43)
    C = kron(C, A{ii});

Error in problem1_itemb (line 16)
[time, ~] = b_method1(8)
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Error in problem1_itemb (line 16)
[time, ~] = b_method1(8)
```

with $N = 4$, and $K = 8$

```
problem1_itemb
    16384      16384

time =

    486.4500
```