

Computational Linear Algebra: Exercises 2

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1. A typical rank-1 update involves a matrix of the general form

$$\mathbf{P} = \mathbf{I} - \mathbf{u}\mathbf{v}^T.$$

Given a matrix \mathbf{A} to be updated, show how to calculate $\mathbf{P}\mathbf{A}$ in the minimum number of operations.

2. Consider the Davidson method for obtaining the lowest eigenvalue of a large symmetric matrix.
 - (a) How might we generalize this to calculate several eigenvalues and eigenvectors?
 - (b) In the lecture orthogonalization of a new vector on the existing expansion space was mentioned. How would you implement this?