

Review 8–4

- Hajin Ju, 2024062806

Problem 1

What is the dimension of the matrix product AB if A is a $p \times q$ matrix and B is a $q \times r$ matrix?

Solution 1

$$p \times r$$

Problem 2

Count the number of scalar multiplications to multiply A and B where A is a $p \times q$ matrix and B is a $q \times r$ matrix.

Solution 2

$$pqr$$

Problem 3

Count the number of scalar multiplications where the dimensions of A_1 , A_2 , and A_3 are 10×100 , 100×5 , and 5×50 , respectively.

1. $(A_1 A_2) A_3$
2. $A_1 (A_2 A_3)$

Solution 3

1. $5000 + 2500 = 7500$
2. $25000 + 50000 = 75000$

Problem 4

Fully parenthesize the product $A_1A_2A_3A_4$. (There are five distinct ways.)

Solution 4

1. $(A_1A_2)(A_3A_4)$
2. $(A_1(A_2A_3))A_4$
3. $A_1(A_2(A_3A_4))$
4. $A_1((A_2A_3)A_4)$
5. $((A_1A_2)A_3)A_4$