Vectors

1. Transpose:

2. Length:

3. Dot product (inner product):

4. Outer product:

Matrices

1. Identity Matrix

2. Diagonal Matrix

3. Multiplication

4. Q: Suppose A is a $m \times n$ matrix and B is a $p \times q$ matrix, when can we compute AB and/or BA?

5. Q: Is $AB = BA$?

6. Matrix Inverse

7. Does $(AB)^{-1}$ equal to $A^{-1}B^{-1}$ or $B^{-1}A^{-1}$?

8. Q: Check that the inverse of $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ is $\dfrac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

9. Matrix Transpose

10. Q: Given a random matrix A, is $A^T A = AA^T$ ture?

11. How does $(AB)^T$ relate to A^T and B^T?

12. Orthogonal Matrices