

Problem 4.2. Take the following matrices:

$$A = \begin{bmatrix} 2 & 3 \\ 4 & 1 \\ 1 & 2 \end{bmatrix}$$

$$B = \begin{bmatrix} 1 & 4 & 1 \\ 2 & 1 & 2 \end{bmatrix}$$

What is $B \cdot A$?

$$\begin{bmatrix} 19 & 9 \\ 10 & 11 \end{bmatrix}$$

Problem 4.3. What is the transpose of the following matrix?

$$\begin{bmatrix} 3.3 & 5.1 \\ 6.1 & 1.23 \\ 45.76 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 3.3 & 6.1 & 45.76 \\ 5.1 & 1.23 & 0 \end{bmatrix}$$

Problem 4.4. Calculate the determinant of

$$\begin{bmatrix} 2 & 3 & 0 \\ 4 & 5 & 2 \\ 2 & 5 & 3 \end{bmatrix} = -14$$

5 Probability theory

Problem 5.1. You run an experiment where you flip a coin twice. Each time you get either heads (H) or tails (T). What is the sample space of your experiment?

$$\Omega = \{(H, H), (H, T), (T, H), (T, T)\}$$

Problem 5.2. You are observing a race with 30 competitors. How many possible outcomes exist for the 1st, 2nd and 3rd place?

$$30 \times 29 \times 28 = 24360$$

Problem 5.3. You run an experiment in which you toss a dice twice and record the results. What is the probability that at least one of the tosses end up being odd?

$$\frac{3}{4}$$