# Exam 2, 10:10am

Linear Algebra, Dave Bayer, November 10, 2022

[1] By least squares, find the equation of the form $y = ax + b$ that best fits the data

$$\begin{bmatrix} x_1 & y_1 \\ x_2 & y_2 \\ x_3 & y_3 \\ x_4 & y_4 \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 0 & 1 \\ 1 & 1 \\ 2 & 2 \end{bmatrix}$$

[2] Find the determinant of the matrix

$$A = \begin{bmatrix} 1 & 0 & 2 & 3 \\ 1 & 0 & 1 & 1 \\ 5 & 5 & 5 & 5 \\ 0 & 0 & 3 & 4 \end{bmatrix}$$

[3] Find the inverse of the matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 1 \\ 0 & 3 & 4 \end{bmatrix}$$

[4] Find the $3 \times 3$ matrix $A$ that projects $R^3$ orthogonally onto the hyperplane $x + y + 2z = 0$, with respect to the usual inner product.

[5] Find the $3 \times 3$ matrix $A$ that projects $R^3$ orthogonally onto the hyperplane $x + y + z = 0$, with respect to the inner product

$$< (a, b, c),\ (r, s, t) > \quad = \quad \begin{bmatrix} a & b & c \end{bmatrix} \begin{bmatrix} 1 & 1 & 0 \\ 1 & 3 & 1 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} r \\ s \\ t \end{bmatrix}$$