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EX.4.1.1.c, Sauer3

Solve the normal equations to find the least squares solution and 2-norm error for the following inconsistent system

$$\left[\begin{array}{cc} 1 & 2 \\ 1 & 1 \\ 2 & 1 \\ 2 & 2 \end{array}\right] \left[\begin{array}{c} x_1 \\ x_2 \end{array}\right] = \left[\begin{array}{c} 3 \\ 3 \\ 3 \\ 2 \end{array}\right].$$