Example Problem #9

Various Least Squares Problems

Problem 6.6) The following data is given:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 1 | 2 | 3 | 5 | 8 |
| y | 0.8 | 1.9 | 2.2 | 3 | 3.5 |

Determine the coefficients m and b in the function  that best fits the data. Write the equation in a linear form and use linear least-squares regression to determine the value of the coefficients.

Problem 6.5) The following data is given:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | -2 | -1 | 0 | 1 | 2 |
| y | 1.5 | 3.2 | 4.5 | 3.4 | 2 |

Determine the coefficients *a* and *b* in the function  that best fit the data.

Problem 6.8) Water solubility in jet fuel, , as a function of temperature, T, can be modeled by an exponential function of the form . The following values of water solubility measured at different temperatures. Using linear regression, determine the constants *m* and *b* that best fit the data. Use the equation to estimate the water solubility at a temperature of 10 oC. Make a plot that shows the function and the data points.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| T (oC) | -40 | -20 | 0 | 20 | 40 |
| Ws (% wt.) | 0.0012 | 0.002 | 0.0032 | 0.006 | 0.0118 |