

## EXERCISE 1: LINEAR REGRESSION

The data in the accompanying table relate heart rate at rest  $Y$  to kilograms body weight  $X$ .

$x$	90	86	67	89	81	75
$y$	62	45	40	55	64	53

- Graph these data. Does it appear that there is a linear relation-ship between body weight and heart rate at rest?
- Compute  $a$ ,  $b$  and write the regression equation for these data. Plot the regression line on the graph from Part (a). Interpret the estimated regression coefficients.
- Now examine the data point (67, 40). If this data point were removed from the data set, what changes would occur in the estimates of  $a$  and  $b$ ?
- Predict the heart rate for a particular subject weighing 88kg.
- Without doing the computations, for which measured  $X$  would the corresponding  $Y$  have the smallest variance? Why?
- What would happen if you apply a polynomial fitting  $y = ax^2 + bx + c$ ?
- And computing this fitting  $y = ax^3 + bx^2 + cx + d$ ?
- Calculate the operation  $y = 1./(y.*y)$  to obtain a new vector and compute a new fitting  $y = a * \exp(-b * x)$
- Calculate the operation  $x2 = x/100$ ;  $y2 = 3 * x2 .* \exp(2 * x2)$ ; and compute a new fitting

$$y = C \cdot x \cdot e^{Ax}$$

What are the values of  $C$  and  $A$ ? Does it seems to  $C = 3$  and  $A = 2$ ? Why not?

**IMPORTANT:** Plot the results in all cases.

## EXERCISE 2: POLINOMIAL FUNCTION IN MATLAB

- Calculate the paragraphs b), f), g), h) and i) using the following MATLAB functions:
  - polyfit: to calculate polynomial coefficients
  - polyval: to evaluate polynomials
- Use the function roots to find the polynomial roots in f and g exercises.