

1 Finding function form

1.1 Mean values of x

$$\begin{aligned}x_n &= x_{10} = 10.000 \\x_{arif} &= \frac{x_1 + x_n}{2} = \frac{1.000 + 10.000}{2} = 5.500 \\x_{geom} &= \sqrt{x_1 * x_n} = \sqrt{1.000 * 10.000} = 3.162 \\x_{garm} &= \frac{2 * x_1 * x_n}{x_1 + x_n} = \frac{2 * 1.000 * 10.000}{1.000 + 10.000} = 1.818\end{aligned}$$

1.2 Interpolated y values for mean values of x

$$\begin{aligned}y_1^* &= f(x_{arif}) = f(5.500) = 6.102 \\y_2^* &= f(x_{geom}) = f(3.162) = 4.436 \\y_3^* &= f(x_{garm}) = f(1.818) = 2.701\end{aligned}$$

1.3 Mean values of y

$$\begin{aligned}y_n &= y_{10} = 7.908 \\y_{arif} &= \frac{y_1 + y_n}{2} = \frac{1.000 + 7.908}{2} = 4.454 \\y_{geom} &= \sqrt{y_1 * y_n} = \sqrt{1.000 * 7.908} = 2.812 \\y_{garm} &= \frac{2 * y_1 * y_n}{y_1 + y_n} = \frac{2 * 1.000 * 7.908}{1.000 + 7.908} = 1.775\end{aligned}$$

1.4 Choosing function form according to epsilon error

$$\begin{aligned}\varepsilon_1 &= |y_1^* - y_{arif}| = |6.102 - 4.454| = 1.648 \\ \varepsilon_2 &= |y_1^* - y_{geom}| = |6.102 - 2.812| = 3.290 \\ \varepsilon_3 &= |y_1^* - y_{garm}| = |6.102 - 1.775| = 4.326 \\ \varepsilon_4 &= |y_2^* - y_{arif}| = |4.436 - 4.454| = 0.018 \\ \varepsilon_5 &= |y_2^* - y_{geom}| = |4.436 - 2.812| = 1.624 \\ \varepsilon_6 &= |y_3^* - y_{arif}| = |2.701 - 4.454| = 1.753 \\ \varepsilon_7 &= |y_3^* - y_{garm}| = |2.701 - 1.775| = 0.926 \\ &\Rightarrow \\ \varepsilon_{min} &= \varepsilon_4 = 0.018 \\ &\Rightarrow \\ y &\approx a + b * \log(x)\end{aligned}$$

2 Fitting arguments

2.1 Transformation of coordinates from xOy to qOz

$$q = \text{phi}(x) = \log(x)$$

$$z = \text{psi}(y) = y$$

$$A = a$$

$$B = b$$

$$z = A + Bq$$

2.2 Fitting arguments for linear function in qOz

$$B = \frac{n * \sum_{i=1}^n q_i * z_i - \sum_{i=1}^n q_i * \sum_{i=1}^n z_i}{n * \sum_{i=1}^n q_i^2 - (\sum_{i=1}^n q_i)^2} = \frac{10 * 98.055 - 15.104 * 55.313}{10 * 27.650 - 228.143} = 3.000$$
$$A = \frac{\sum_{i=1}^n z_i - B * \sum_{i=1}^n q_i}{n} = \frac{55.313 - 3.000 * 15.104}{10} = 1.000$$

2.3 Mapping arguments back to xOy

$$a = A = 1.000$$

$$b = B = 3.000$$

$$y \approx 1.000 + 3.000 * \log(x)$$