

例題 6.3

(重みなし)線形最小二乗法

| data # | x | y | δy | $w=1/(\delta y)^2$ | $w \times x$ | $w \times x^2$ | $w \times y$ | $w \times xy$ | $(y-A-Bx)^2$ | | |
|--------|----------|--------------------------|------------|--------------------|--------------|----------------|--------------|---------------|--------------|------------|------------|
| 1 | 0.003333 | -15.04 | 1 | 1 | 0.003333 | 1.11089E-05 | -15.04 | -0.05012832 | 0.010226817 | | |
| 2 | 0.00303 | -14.03 | 1 | 1 | 0.00303 | 9.1809E-06 | -14.03 | -0.0425109 | 0.003693191 | | |
| 3 | 0.0025 | -12.53 | 1 | 1 | 0.0025 | 0.00000625 | -12.53 | -0.031325 | 0.005974556 | | |
| 4 | 0.002 | -11.18 | 1 | 1 | 0.002 | 0.000004 | -11.18 | -0.02236 | 0.000772242 | | |
| 5 | 0.001667 | -10.29 | 1 | 1 | 0.001667 | 2.77889E-06 | -10.29 | -0.01715343 | 0.000203969 | | |
| 6 | 0.001429 | -9.66 | 1 | 1 | 0.001429 | 2.04204E-06 | -9.66 | -0.01380414 | 0.002544862 | | |
| | | | | 6 | 0.013959 | 3.53607E-05 | -72.73 | -0.17728179 | 0.023415637 | | |
| | | | S | Sx | Sxx | Sy | Sxy | sum | | | |
| | $x=1/T$ | $y=\ln\langle D \rangle$ | | | | | | | | | |
| | | | | 1.73106E-05 | -5.60976 | 5181 | -2799.012029 | 1.42923 | 6402 | 588.734045 | 0.06843338 |
| | | | Δ | A | B | δA | δB | 9.21 式 | | | |

| x | y | 9.21 式 | $w=1/(\delta y)^2$ | $w \times x$ | $w \times x^2$ | $w \times y$ | $w \times xy$ |
|----------|--------------------------|------------|--------------------|--------------|----------------|--------------|---------------|
| 0.003333 | -15.04 | 0.06843338 | 213.532519 | 0.711703886 | 0.002372109 | -3211.529086 | -10.70402644 |
| 0.00303 | -14.03 | 0.06843338 | 213.532519 | 0.647003533 | 0.001960421 | -2995.861242 | -9.077459562 |
| 0.0025 | -12.53 | 0.06843338 | 213.532519 | 0.533831298 | 0.001334578 | -2675.562463 | -6.688906158 |
| 0.002 | -11.18 | 0.06843338 | 213.532519 | 0.427065038 | 0.00085413 | -2387.293562 | -4.774587125 |
| 0.001667 | -10.29 | 0.06843338 | 213.532519 | 0.355958709 | 0.000593383 | -2197.249621 | -3.662815117 |
| 0.001429 | -9.66 | 0.06843338 | 213.532519 | 0.30513797 | 0.000436042 | -2062.724134 | -2.947632787 |
| | | | 1281.195114 | 2.980700433 | 0.007550663 | -15530.22011 | -37.85542719 |
| | | | S | Sx | Sxx | Sy | Sxy |
| $x=1/T$ | $y=\ln\langle D \rangle$ | | | | | | |
| | | | 0.789297988 | -5.609765181 | -2799.012029 | 0.097807477 | 40.28906039 |
| | | | Δ | A | B | δA | δB |

GNUPLOT

a = -5.60977 +/- 0.1094 (1.949%)

b = -2799.01 +/- 45.04 (1.609%)

Igor

$$a = -5.6098 \pm 0.109$$

$$b = -2799 \pm 45$$

