UNIVERSITAS AHMAD DAHLAN

PROGRAM MAGISTER PENDIDIKAN FISIKA

CASE STUDIES: CURVE FITTING

1. Impedansi rangkaian *RL* dinyatakan oleh persamaan :



Suatu percobaan untuk mengukur *R* dan *L* telah dilakukan menggunakan rangkaian *RL*. Frekuensi *f* diubah-ubah kemudian *Z* diukur, dan didapatkan data sebagai barikut:

|  |  |  |
| --- | --- | --- |
| No. | *f* ± Δ*f* (Hz) | *Z* ±ΔZ (ohm) |
| 1 | 120±4 | 7,4±0,2 |
| 2 | 160±3 | 8,4±0,1 |
| 3 | 190±4 | 9,1±0,2 |
| 4 | 200±4 | 9,6±0,2 |
| 5 | 230±3 | 10,3±0,1 |
| 6 | 240±3 | 10,5±0,2 |
| 7 | 270±4 | 11,4±0,1 |
| 8 | 290±3 | 11,9±0,1 |
| 9 | 300±3 | 12,2±0,1 |

Dengan menggunakan analisis regresi, (a) buatlah tabel data perhitungan analisis regresi, (b) hitunglah nilai  dan , dan (c) simpulkan hasil pengukuran ini berdasarkan nilai .

1. Tabel di bawah ini menunjukkan data peluruhan radioaktif dari isotop tertentu. Dengan menggunakan pencocokan kuadrat terkecil (*least-squares fit*), tentukan waktu paroh dari isotop tersebut beserta katidakpastiannya

|  |  |  |  |
| --- | --- | --- | --- |
| Waktu (menit) | Cacah | Waktu (menit) | Cacah |
| 0 | 500 | 6 | 164 |
| 1 | 430 | 7 | 130 |
| 2 | 310 | 8 | 92 |
| 3 | 265 | 9 | 89 |
| 4 | 240 | 10 | 75 |
| 5 | 186 |  |  |

1. Background. Engineering design variables are often dependent on several independent variables. Often this functional dependence is best characterized by multivariate power equations. As discussed in Sec. 17.3, a multiple linear regression of log-transformed data provides a means to evaluate such relationships. For example, a mechanical engineering study indicates that fluid flow through a pipe is related to pipe diameter and slope (Table 20.4). Use multiple linear regression to analyze this data. Then use the resulting model to predict the flow for a pipe with a diameter of 2.5 ft and a slope of 0.025 ft/ft.

Solution. The power equation to be evaluated is

*Q* = *a*0*Da*1*Sa*2

