**Muhammad Azhar Rasyad**

0110217029

Teknik Informatika

Analisis Numerik – **Regresi Linier**

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### a. Source Code

```
from math import sqrt

# 1. Memasukkan Data (Pilih Salah Satu)

# Contoh Soal
x = [5, 10, 15, 20, 25, 30, 35, 40]
y = [40, 30, 25, 40, 18, 20, 22, 15]

# Soal Nomor 1
# x = [1.0, 1.5, 2.0, 2.5, 3.0]
# y = [2.0, 3.2, 4.1, 4.9, 5.9]

# Soal Nomor 2
# x = [0.1, 0.4, 0.5, 0.7, 0.7, 0.9]
# y = [0.61, 0.92, 0.99, 1.52, 1.47, 2.03]

# Percobaan
# x = []
# y = []

# 2. Menghitung Data
n = len(x)
x2 = []
xy = []

for i in range(0, n) :
    x2.append(x[i] * x[i])
    xy.append(x[i] * y[i])

m = ((n * sum(xy)) - (sum(x) * sum(y))) / ((n * sum(x2)) - (sum(x)**2))
c = (sum(y) - (m * sum(x))) / (n)

# 3. Menampilkan Tabel Data
print("===== Tabel Data =====")
print()
print("i\tx\ty\tx2\txy")
print("~\t~\t~\t~\t~")
for i in range(0, n) :
```

```
    print(f"{i}\t{repr(x[i]):.6}\t{repr(y[i]):.6}\t{repr(x2[i]):.6}\
t{repr(xy[i]):.6}".format(1 / 4))
print("~\t~\t~\t~\t~")
print(f"{n}\t{repr(sum(x)):.6}\t{repr(sum(y)):.6}\t{repr(sum(x2)):.6}\
t{repr(sum(xy)):.6}")

print()
print(f"m = {repr(m):.6}")
print(f"c = {repr(c):.6}")
print()

# 4. Menghitung RMS
fx = []
fxy = 0

for i in range(0, n) :
    fx.append((m * x[i]) + c)

# 5. Menampilkan Tabel RMS
print("===== Tabel RMS =====")
print()
print("i\tfx\tfx - y\t(fx - y)2")
print("~\t~\t~\t~")
for i in range(0, n) :
    print(f"{i}\t{repr(fx[i]):.6}\t{repr(fx[i] - y[i]):.6}\t{repr((fx[i] -
y[i])**2):.6}")
    fxy = (fxy) + (fx[i] - y[i])**2
print("~\t~\t~\t~")
print(f"\t\t\t{repr(fxy):.6}")

# 6. Menghitung RMS
print()
print(f"RMS = {repr(sqrt(fxy / n)):.6}")
```

**b. Hasil Contoh Soal**

```
===== Tabel Data =====

i       x       y       x2      xy
~       ~       ~       ~       ~
0       5       40      25      200
1       10      30      100     300
2       15      25      225     375
3       20      40      400     800
4       25      18      625     450
5       30      20      900     600
6       35      22      1225    770
7       40      15      1600    600
~       ~       ~       ~       ~
8       180     210     5100    4095

m = -0.6
c = 39.75

===== Tabel RMS =====

i       fx      fx - y  (fx - y)2
~       ~       ~       ~
0       36.75   -3.25   10.562
1       33.75   3.75    14.062
2       30.75   5.75    33.062
3       27.75   -12.25  150.06
4       24.75   6.75    45.562
5       21.75   1.75    3.0625
6       18.75   -3.25   10.562
7       15.75   0.75    0.5625
~       ~       ~       ~
                        267.5

RMS = 5.7825
```

**c. Hasil Soal Nomor 1**

```
===== Tabel Data =====

i       x       y       x2      xy
~       ~       ~       ~       ~
0       1.0     2.0     1.0     2.0
1       1.5     3.2     2.25    4.8000
2       2.0     4.1     4.0     8.2
3       2.5     4.9     6.25    12.25
4       3.0     5.9     9.0     17.700
~       ~       ~       ~       ~
5       10.0    20.1    22.5    44.95

m = 1.9
c = 0.2200

===== Tabel RMS =====

i       fx      fx - y  (fx - y)2
~       ~       ~       ~
0       2.12    0.1200  0.0144
1       3.07    -0.130  0.0169
2       4.0200  -0.079  0.0063
3       4.9700  0.0700  0.0049
4       5.92    0.0199  0.0003
~       ~       ~       ~
                        0.0430

RMS = 0.0927
```

**d. Hasil Soal Nomor 2**

```
===== Tabel Data =====

i       x       y       x2      xy
~       ~       ~       ~       ~
0       0.1     0.61    0.0100  0.061
1       0.4     0.92    0.1600  0.3680
2       0.5     0.99    0.25    0.495
3       0.7     1.52    0.4899  1.0639
4       0.7     1.47    0.4899  1.029
5       0.9     2.03    0.81    1.827
~       ~       ~       ~       ~
6       3.3     7.5399  2.21    4.8439

m = 1.7645
c = 0.2861

===== Tabel RMS =====

i       fx      fx - y  (fx - y)2
~       ~       ~       ~
0       0.4626  -0.147  0.0217
1       0.9919  0.0719  0.0051
2       1.1684  0.1784  0.0318
3       1.5213  0.0013  1.8230
4       1.5213  0.0513  0.0026
5       1.8742  -0.155  0.0242
~       ~       ~       ~
                        0.0856

RMS = 0.1194
```