

## **The methods of experimental data processing.**

**The objectives of the task:** Strengthening skills in using the method of least squares.

**Task Requirements:** As a result of the experiment was to determine some tabular dependence. Using the least squares method to determine the regression line calculate the correlation coefficient, to pick a predetermined functional relationship of the form to calculate the regression coefficient. Determine the total error.

### **Instructions for performing:**

1. Create script file with a function. - 0.3 points
2. Add to script file tabulated values in the form matrix of initial data. - 0.3 points
3. Initial guess. - 0.3 points
4. The solution of the problem. -0.8 points
5. Plotting the experimental data. -0.4 points
6. Plotting the resulting function. - 0.4 points
7. Available Comments - 0.5 points

Maximum evaluation are **3 points**

You need to create a script file with function, experimental data and to obtain a graph, then you need to do a scan the graph and send me the script file and the scan of graph.

Variants of tasks.

1.  $P(s) = As^3 + Bs^2 + D$

s	0	1	1.5	2	2.5	3	3.5	4	4.5	5
P	12	10.1	11.58	17.4	30.68	53.6	87.78	136.9	202.5	287

2.  $G(s) = As^b$

s	0.5	1.5	2	2.5	3	3.5	4	4.5	5
G	3.99	5.65	6.41	6.71	7.215	7.611	7.83	8.19	8.3

3.  $V(s) = As^b e^{Cs}$

s	0.2	0.7	1.2	1.7	2.2	2.7	3.2
V	2.3198	2.8569	3.5999	4.4357	5.5781	6.9459	8.6621

4.  $W(s) = \frac{A}{Bs + C}$

s	1	2	3	4	5	6	7	8	9
W	0.529	0.298	0.267	0.171	0.156	0.124	0.1	0.078	0.075

5.  $Q(s) = As^2 + Bs + C$

s	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3
Q	5.21	4.196	3.759	3.672	4.592	4.621	5.758	7.173	9.269

6.  $Y = \frac{x}{Ax - B}$

x	3	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Y	0.61	0.6	0.592	0.58	0.585	0.583	0.582	0.57	0.572	0.571

7.  $V = \frac{1}{A + Be^{-U}}$

U	0	1	1.5	2	2.5	3	3.5	4	4.5	5
V	12	10.1	11.58	17.4	30.68	53.6	87.78	136.9	202.5	287

8.  $Z = At^4 + Bt^3 + Ct^2 + Dt + K$

t	0.66	0.9	1.17	1.47	1.7	1.74	2.08	2.63	3.12
Z	38.9	68.8	64.4	66.5	64.95	59.36	82.6	90.63	113.5

9.  $R = Ch^2 + Dh + K$

h	2	4	6	8	10	12	14	16
R	0.035	0.09	0.147	0.2	0.24	0.28	0.31	0.34

10.  $Y = Ax^3 + Bx^2 + Cx + D$

$x$	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3
$Y$	1.5	2.7	3.9	5.5	7.1	9.1	11.1	12.9	15.5	17.9

11.  $Y = Ax^3 + Cx + D$

$x$	0	0.4	0.8	1.2	1.6	2
$Y$	1.2	2.2	3.0	6.0	7.7	13.6

12.  $R = Ch^2 + K$

$h$	0.29	0.57	0.86	0.14	1.43	1.71	1.82	2
$R$	3.33	6.67	7.5	13.33	16.67	23.33	27.8	33.35

13.  $Z = At^4 + Ct^2 + K$

$t$	1	1.14	1.29	1.43	1.57	1.71	1.86	1.92	2
$Z$	6.2	7.2	9.6	12.5	17.1	22.2	28.3	35.3	36.5

14.  $Z = At^4 + Bt^3 + Dt + K$

$t$	2	2.13	2.25	2.38	2.5	2.63	2.75	2.88	3
$Z$	12.57	16.43	19	22.86	26.71	31.86	37.0	43.43	49.86

15.  $Z = At^4 + Dt + K$

$t$	0.88	0.9	0.91	0.93	0.94	0.96	0.97	0.99	1
$Z$	0.029	0.086	0.17	0.31	0.43	0.57	0.71	0.86	0.97

**Criteria for evaluation:** Available Comments, no mistakes, the presence of axis and graph labels .