determinantal equation is

$$\begin{vmatrix} x & y & l \\ \sum x_i & \sum y_i & n \\ \sum x_i^2 & \sum x_i y_i & \sum x_i \end{vmatrix} = 0 \text{ or } \begin{vmatrix} x & y & l \\ \overline{x} & \overline{y} & l \\ \sum x_i^2 & \sum x_i y_i & \sum x_i \end{vmatrix} = 0$$

The second row in the last equation show that the line of best fit passes through the point $P(\overline{x}, \overline{y})$.

Observe that the first equation in (l) for parameters can be obtained practically from $y_i = Ax_i + B$ by summation; and the second by summation after multiplying by x_i.

Example. Given the data

x	-1	0	1	2	3	4
y	2	1	0	-3	-5	-8

find the equation of the line of best fit.
Solution.

x	y	x^2	xy
-1	2	1	-2
0	1	0	0
1	0	1	0
2	-3	4	-6
3	-5	9	-15
4	-8	16	-32
9	-13	31	-55

$$\Longrightarrow 9A + 6B = -13$$

$$31A + 9B = -55$$

$$\Longrightarrow A = -\frac{213}{105}, B = \frac{92}{105}$$

$$\Longleftrightarrow y = -\frac{213}{105}x + \frac{92}{105}$$

$$= -2,028x + 0,876$$

Where there are more than one variable, say two variables, in the case of linear approximation the general linear equation is

$$z = Ax + By + C \ ,$$

and by the MLS one may obtain the following equations for parameters: