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202107416

(1) daily_new_cases	(2) daily_new_deaths	(1)	(2)
227	8	254	28
322	11	276	10
385	29		
76	8		
152	8		
414	11		
104	14		
106	5		
206	21		
119	18		
233	26		
220	50		
284	18		
291	20		
230	14		
207	13		
218	25		
209	10		
172	12		
200	19		
140	9		
111	9		
271	16		
211	15		
102	17		
285	7		
198	10		
181	19		

The following values can be obtained:

$n = 30$ $\quad \sum y_i = 480$

$\sum x_i = 6404$ $\quad \sum x_i y_i = 107440$

$\sum x_i^2 = 1561096$ $\quad \sum x_i^2 y_i = 26794142$

$\sum x_i^3 = 422984282$

$\sum x_i^4 = 124999670284$

Plugging the values into system of linear equations:

$$\begin{bmatrix} 30 & 6404 & 1561096 \\ 6404 & 1561096 & 422984282 \\ 1561096 & 422984282 & 124999670284 \end{bmatrix} \times \begin{bmatrix} a_0 \\ a_1 \\ a_2 \end{bmatrix} = \begin{bmatrix} 480 \\ 107440 \\ 26794142 \end{bmatrix}$$

Solving for the system

Iteration 1

$$\begin{bmatrix} 1561096 & 422984282 & 124999670284 & 26794142 \\ 6404 & 1561096 & 422984282 & 107440 \\ 30 & 6404 & 1561096 & 480 \end{bmatrix}$$

Normalization

$$\begin{bmatrix} 1 & 270.9534 & 80071.7382 & 17.1637 \\ 6404 & 1561096 & 422984282 & 107440 \\ 30 & 6404 & 1561096 & 480 \end{bmatrix}$$

Elimination of 2nd row

Temp vector

6404 1735185.5740 512779411.4000 109916.3348

$$\begin{bmatrix} 1 & 270.9534 & 80071.7382 & 17.1637 \\ 0 & -174089.5740 & -89795129.4000 & -2476.3348 \\ 30 & 6404 & 1561096 & 480 \end{bmatrix}$$

Elimination of 3rd row

Temp vector

30 8128.6020 2402152.1460 514.9110

$$\begin{bmatrix} 1 & 270.9534 & 80071.7382 & 17.1637 \\ 0 & -174089.5740 & -89795129.4000 & -2476.3348 \\ 0 & -1724.6020 & -841056.1460 & -34.9110 \end{bmatrix}$$

Iteration 2

$$\begin{bmatrix} 1 & 270.9534 & 80071.7382 & 17.1637 \\ 0 & -174089.5740 & -89795129.4000 & -2476.3348 \\ 0 & -1724.6020 & -841056.1460 & -34.9110 \end{bmatrix}$$

Normalization

$$\begin{bmatrix} 1 & 270.9534 & 80071.7382 & 17.1637 \\ 0 & 1 & 515.7984 & 0.0142 \\ 0 & -1724.6020 & -841056.1460 & -34.9110 \end{bmatrix}$$

Elimination of 1st row

Temp vector

0 270.9534 139757.3302 3.8475

$$\begin{bmatrix} 1 & 0 & -59685.5920 & 13.3162 \\ 0 & 1 & 515.7984 & 0.0142 \\ 0 & -1724.6020 & -841056.1460 & -34.9110 \end{bmatrix}$$

Elimination of 3rd row

Temp vector

0 -1724.6020 -889546.9522 -24.4893

$$\begin{bmatrix} 1 & 0 & -59685.5920 & 13.3162 \\ 0 & 1 & 515.7984 & 0.0142 \\ 0 & 0 & 48490.8062 & -10.4217 \end{bmatrix}$$

Iteration 3

$$\begin{bmatrix} 1 & 0 & -59685.5920 & 13.3162 \\ 0 & 1 & 515.7984 & 0.0142 \\ 0 & 0 & 48490.8062 & -10.4217 \end{bmatrix}$$

Normalization

$$\begin{bmatrix} 1 & 0 & -59685.5920 & 13.3162 \\ 0 & 1 & 515.7984 & 0.0142 \\ 0 & 0 & 1 & -0.0002 \end{bmatrix}$$

Elimination of 1st row

Temp vector

0 0 -59685.5920 11.9371

$$\begin{bmatrix} 1 & 0 & 0 & 1.3791 \\ 0 & 1 & 515.7984 & 0.0142 \\ 0 & 0 & 1 & -0.0002 \end{bmatrix}$$

Elimination of 2nd row

0 0 515.7984 -0.1032

$$\begin{bmatrix} 1 & 0 & 0 & 1.3791 \\ 0 & 1 & 0 & 0.1174 \\ 0 & 0 & 1 & -0.0002 \end{bmatrix}$$

$$\begin{bmatrix} a_0 \\ a_1 \\ a_2 \end{bmatrix} = \begin{bmatrix} 1.3791 \\ 0.1174 \\ -0.0002 \end{bmatrix}$$ thus, the equation is:

$$f(x) = 1.3791 + 0.1174x + (-0.0002)x^2$$

or

$$f(x) = 1.3791 + 0.1174x - 0.0002x^2$$