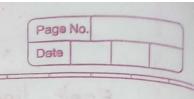
Date
Simple lines Model !-
In somple linea Regermon and variable x (Imput)
and voridole x (Imput)
deped vorble y (output)
assumed that relationship beth on and g is lines, it can be apriled by line
y = ax + b
y = antb y = predicted value a < slope of line b < intyl of
at slope of line
62 initial of the state of sine of larger orthogon son to see
n < impet value. D= ((d+1000) - 18) 10 5 9-
heal; we want to determine the volving stop a and b intrugt to such
that the line best for the given data point.
0=20 3 9-20 3 0-1K,00 Z
lest sq. estimates - 121 121 121 121 121 121
To I the value a and by we use least square memod. I'm
of this method is to find the line that uninimizes sum of squad
I walked I the predicted yarders.
Ill a see het the aires of
differences bethe the actual y-value of the protected y-value.
for the line.
from the line.
for each date point (Mi, yi) the predicted value from the line is,
from the line.
for each date point (m; y;) the predicted volve from the line is,
for each date point (n; y:) the predicted value from the line is, The Evidual error of each date points are 3
for each date point (m; y;) the predicted volve from the line is,
for each date point (m; y;) the predicted value from the line is, y; = axi + b The Evidual error of each date points are; e; = y; - (axi + b) e; = y; - (axi + b)
for each date point (n; y:) the predicted value from the line is, The Evidual error of each date points are 3



frinimizing sum of squad Postduck & $\frac{\partial}{\partial a} s(a_1b) = \frac{\partial}{\partial a} \sum_{i=1}^{n} (y_i - (a_{i}x_i + b))^2$

using the chain sale, weget,

 $\partial s(a_1b) = -2 \stackrel{\circ}{\Sigma} x_i \left(\frac{1}{2}i - (\alpha x_i + b) \right)$

we set this distrative equal to zero to minimize the sum of sq. Eisidual. n < mont value

-2 Z ni (y; - (ani+b)) =0

Z 21 (4; - a24'-b) = 0

 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

and the volue a and by us use less squar withed. The fine ised () of ab) ? - coloration topic all it bail of 2 boother call to $\frac{2}{2a}$ $\frac{3(a_1b)}{2b}$ $\frac{2}{12}$ $\frac{3(a_1b)}{2a}$ $\frac{3}{2}$ $\frac{3(a_1b)}{2a}$ $\frac{3(a_1b)}{$

using the chairs Ede, weigh.

 $\frac{\partial}{\partial a} \left(2 \left(a_1 b \right) = -2 \sum_{i=1}^{n} \left(g_i - \left(a_{ni} + b \right) \right) \right)$

so this equal to zero 3 - died alob dos to some libes in

2 (gi - ani-b) 20

Zyi - 0 Zzi - b Z 1 = 0 = : Since Sum uf g is fit n

(the no of date Pi

b = 1 $\left(\sum y_i - \alpha \sum x_i \right) = \sum y_i - \alpha \sum x_i - b = 0$

now we have to equations?

solving for slope a

az nzovy: - zx; zy; $n \stackrel{\sim}{\Sigma} x_i^2 - \left(\stackrel{\sim}{\Sigma} x_i \right)^2$

solve for the end equation :-

 $\sum_{i=1}^{n} y_i - a \sum_{i=1}^{n} y_i - nb = 0$

Pearujing the egn isolate b: $nb = \sum_{i=1}^{n} j_i - a \sum_{i=1}^{n} x_i^i$

b = 1 \ \frac{5}{2} \di - a \ \frac{7}{2} \di

- - d'uide by n.

This the inteript b is ?

 $b = \sum_{i=1}^{2} y_i - \alpha \sum_{i=1}^{2} y_i$

Substitute b into frost egn.

Z 24 (41-974-6) = 0

 $\sum xi \left[y_i - ax_i - \left(\sum y_i - a \sum x_i \right) \right] = 0$

prohibete the summetron imide pounthis.

$$Z niyi - a Z ni^2 - Z ni \left(\frac{Z yi}{n} \right) + a Z ni \left(\frac{Z ni}{n} \right) = 0$$

Page No. Date theya valation squad distance prepondiales distance formula = Ol mrs) gomal ego of shought line. y=ax+b+c Qx-44620 The Low distance of from point (20, 40) to the line ky the ega Ax+ By+ C=0 is d= | A 26 + Byo + c | VA2+B2 For 8 -Y= ax+b ax - y+b = 0 Here 1. A= 9 B=-1 c= b d= | axo-do+b | ⇒ d= | axo-do+b D/(6/16) = a = (axi - yi+b) $S = \sum_{i=1}^{n} \left(\alpha n_i - y_i + b \right)^2$

I (am-9+6) (x (a2+1) - a (ax-9+6)) = 0

dy 36=0 = Z 2 (ani-yi+b)

0 = [(ani-y.+b)

nb +a zni = zyi

b= Zy, - a Z 24'