| _        | Lecture - 0b 02/13/2020  |      |
|----------|--|------|
|          | Var[x] is estimated by 5°x   |      |
|          | Review for lab-03  |      |
|          | (x-yx)   |      |
| 4        | $g(x^{-1}) = 1$  |      |
|          | - · · · · · · · · · · · · · · · · · · ·                                  |      |
|          | SAE W Z 1 g(X) + 4.  |      |
|          | D=1 11 120 1-0   |      |
|          | 90   |      |
|          | H= [10, 20: WGRP+1]  |      |
|          | 1-0  |      |
|          |  |      |
|          | Recall: (**xn-'x =)=   |      |
|          | N-O  |      |
|          | y < R  | -    |
|          | P=1 Wo+W,X, 40W +0W  |      |
|          |  |      |
|          | H=[W.X:WERP+1] all linear models   |      |
|          | $\vec{x} = [\vec{x}]$ 55E => Sum of sqd.                                 | erro |
| 221      |  |      |
| ordinary | LS) <a: (4i-ti.="" :="avgmax" =="" bob="" td="" ti)27<=""><td></td></a:> |      |
|          | DP+1 ( [21   |      |
| regres   |  |      |
|          | least square   |      |
|          | using calculus   |      |
|          | $b_0 = \overline{y} - b, \overline{x}$                                   |      |
|          | (PX + X; V - V; X - , P, X ) = 1   |      |
|          | b1 = 2 x141 - nx9  |      |
|          | $Z X_1^2 - n \overline{X}^2$   |      |
|          | (PROTPROTPROTURE) ! =  |      |
|          | 4-0  |      |
| 70       |  |      |
|          | (PKM- arak-1)  |      |
|          |  |      |

| 0.0       | oeleileo   | Lecture - Ob       |          |
|-----------|--|--------------------|----------|
|           | Mr Tx7 so sole 1 1 1 ca.   |                    |          |
|           | $S^{2}x := 1 \qquad (x_{1} - \overline{x})$ $h-1 \qquad i=1$   | Pening for late -  |          |
|           | 5ª , 1 3 (x - 7)   | 2 101 01311137     |          |
|           | n-1 i=1  | ( (-x )E)          |          |
|           | (1-) (2)   |                    |          |
|           | $\frac{1}{2} \left( x_{c}^{\alpha} - 9\overline{x} \right)$  | 1 x 2)             |          |
|           | n-1 (2)  | X <sub>1</sub> · A |          |
|           | 110  |                    |          |
|           | $= 1 \left( \leq x_i^2 - 2n^{\frac{1}{2}} \right)$   | 2 1 n x 2)         |          |
|           | n-1  | VIFILA             |          |
|           | Company of the second second   |                    |          |
|           | $= \frac{1}{2} \left( \sum x_{i}^{2} - n \overline{x}^{2} \right)$   | Recell!            |          |
|           | n-1  |                    |          |
|           |  | 91≥µ               |          |
|           | For a r.v's x, y   |                    |          |
|           | 17, 9 4 00   |                    |          |
| 2         | Correlation ! corr [x, y] = Cor  | r [x,4]            |          |
|           |  | I ExJ Var (4)      |          |
| orra dapa | 1 m 2 C#188  | X     =   X        |          |
| 9.57      | Covoriance: COV [x, 4] = E[(x  |                    |          |
| 7         | The state of the s | = dd 11 -> (210)   | 1, samps |
|           | COV [x,4] estimated by Sxy   | 11622100           | 5 90     |
|           | Sxy = 1 3 (x, -x) (4,  | +67                |          |
|           | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | - 1)               |          |
|           | = 1  | using calculus.    |          |
|           | $= \frac{1}{2} \left( x_1 Y_1 - x_1 \overline{Y} \right)$  | - 4; X + X Y)      |          |
|           | n-1 (=1 #80 - 1/48   | 'a a d             | -        |
|           | X 2 - 0 X 4 - 0 X  |                    |          |
|           | = 1 ( = x, 4, - n x y -  | nxy + nxy)         |          |
|           | n-,  |                    |          |
|           |  |                    |          |
|           | = 1 ( Zx146 - nx9  |                    | 1        |
|           | n-1  |                    |          |
|           |  |                    |          |

| II. |    |   |
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| -   |    |   |
| -9  |    |   |
| -90 |    |   |
| 3   |    | Correlation   |
|     |    |   |
| -5  |    | Corr [x, 4] is estimated by   |
|     |    |   |
|     |    | r := Sxy = Sxy  |
|     |    | Js°x5"y Sx Sy   |
|     |    |   |
|     |    | Using calculus  |
|     |    | 54, 7   |
|     |    | bo = 9-bix = 9-r 54/sx x  |
|     |    | 1 5 4 4 2 7 7 7   |
|     |    | $b_1 = \frac{\leq x_1 Y_0 - n \bar{x} \bar{y}}{\leq x_1^2 - n \bar{x}^2}$               |
|     |    | 2 1 - 11 1  |
|     |    | = (n-1) Sxy = Sxy - rSxSy = rSy   |
| -3  |    | $= \frac{(n-1)Sxy}{(n-1)S^2x} = \frac{Sxy}{S^2x} = \frac{rSy}{S^2x} = \frac{rSy}{S^2x}$ |
| -3  |    |   |
| -3  | => | g(x) = bo + bix (how to predict)  |
| -   |    | Idala A:  |
| -3  |    | A:  |
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