HEWLETT hp PACKARD

MODEL 5

9805 STATISTICS CALCULATOR

TECHNICAL DATA APRIL 1973

If analyzing data is an important part of your work, the Model 5 Stat Calculator can make your life a lot easier. It is so simple, in fact, that there's no programming to learn, no languages to learn, no new terminology. The words and symbols you see on the keyboard are ones you use every day. For entering data there is a data entry key, for generating a histogram for a set of data there is a histogram key, there is a delete key for correcting erroneous entries. You'll find the 5 keyboard has been arranged with you in mind.

Choose One of the Five Powerful Systems

There are five variations to the Model 5 Stat Calculator, each one a complete system.

System 1 – The Basic Stat System: A printing desktop system that does the following calculations.

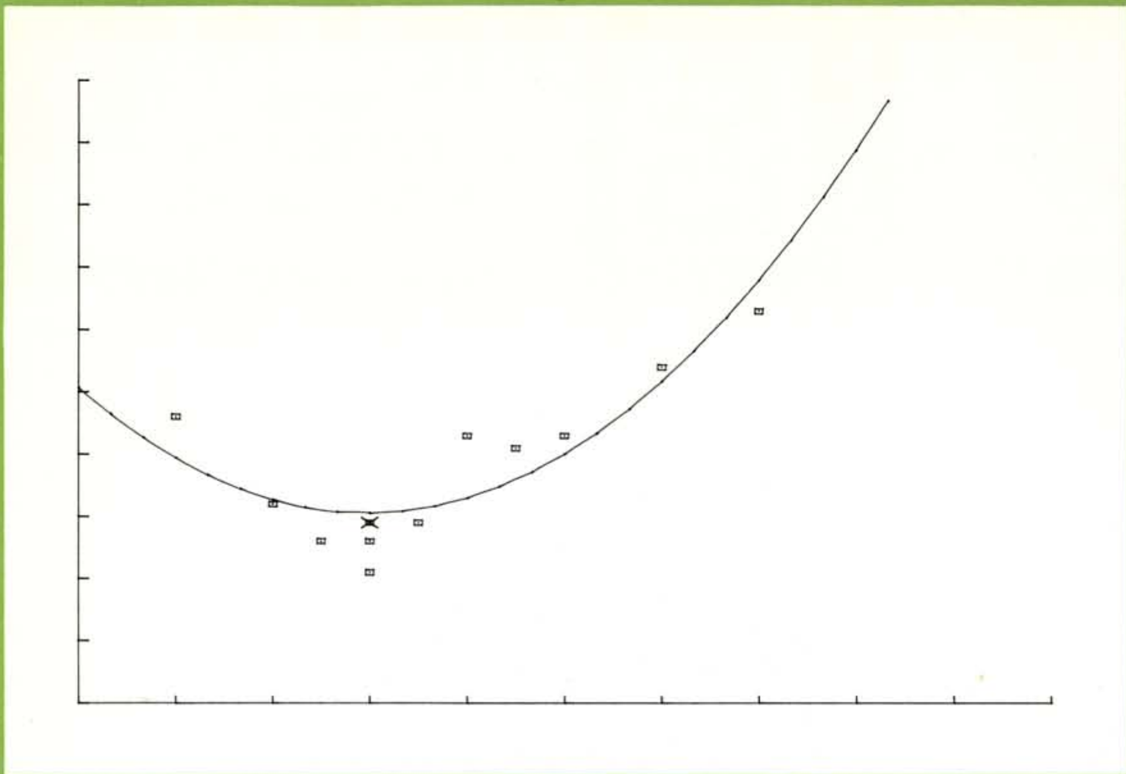
- Linear Curve Fit
- Parabolic Curve Fit
- Mean
- Standard Deviation
- Correlation Coefficient
- Histogram
- t for paired & unpaired data

System 2 – Basic Stat System with Display: Adds a display to System 1.

System 3 – Basic Stat System with Plotter: Adds a plotter interface making the Model 5 compatible with HP's 9862 Plotter. System 3 will plot Linear and Parabolic Curve Fit and Histograms. Draws axes as well.

System 4 – Expanded Stat System: Adds internal expanded stat package. System 4 adds calculations of power, exponential and logarithmic curve fit as well as one-way analysis of variance.

System 5 – Expanded Stat System with Plotter: Adds plotter to System 4. System 5 will plot all 5 possible curve fit, will label both x and y axes, and will plot normal curve overlays on histograms.



```
V2    .......
```

Select 2 Variables for Regression

```
      .00    +
      RG1    =
      .00    #
    10.00    #
```

Establish Range of x from 0 to 10 Units

```
      .00    +
      RG2    =
      .00    #
    10.00    #
```

Establish Range of y from 0 to 10 Units

```
     1.00    +
      T I    =
     1.00    #
     1.00    #
```

Draw a Tic Mark every 1 Unit on both x and y Axes

```
      .00    +
       AI    =
      .00    #
      .00    #
```

Draw Plot so Axes Intersect at 0,0

```
    CT3
```

Select Character #3 to indicate Data Points

```
    1.00    #
    4.60    #

    2.00    #
    3.20    #

    2.50    #
    2.60    #

    3.00    #
    2.10    #

    3.00    #
    2.60    #

    3.00    #
    2.90    #
```

Input x, y Pairs of Data

```
      D E L
    3.00    #
    2.90    #
```

Delete 3.00, 2.90 Pair (Note ✕ on Plot)

```
    3.50    #
    2.90    #

    4.00    #
    4.30    #

    4.50    #
    4.10    #

    5.00    #
    4.30    #

    6.00    #
    5.40    #

    7.00    #
    6.30    #
```

More Data

```
           A    =
     5.08       #
           B    =
-    1.36       #
           C    =
      .23       #
r2              =
      .79       #
```

Print Out Coefficients of Best Fit Parabola

Parabolic Curve Fit

Plotted with System 2

```
        CLEAR

PRGM
  1.00          #

140.00          #
   .00          #
 10.00          #

 30.00          #
   .00          #
  2.00          #

      AI        =
   .00          #
   .00          #
```

Select Plot Labeling Program

Set x Range from 0 to 140, place Tic Marks every 10 Units

Set y Range from 0 to 30, place Tic Marks every 2 Units

Coordinates of Origin

```
       PRGM
       2.00       #

     DATACLEAR

V2   .......

      10.00       #
      28.00       #

      20.00       #
      22.00       #

      30.00       #
      12.00       #

      50.00       #
       7.00       #

      60.00       #
       6.50       #

      80.00       #
       5.40       #

     110.00       #
       4.10       #

      25.00       #
      15.20       #
```

Select Program 2, Expanded Regression Program

Enter x, y Pairs

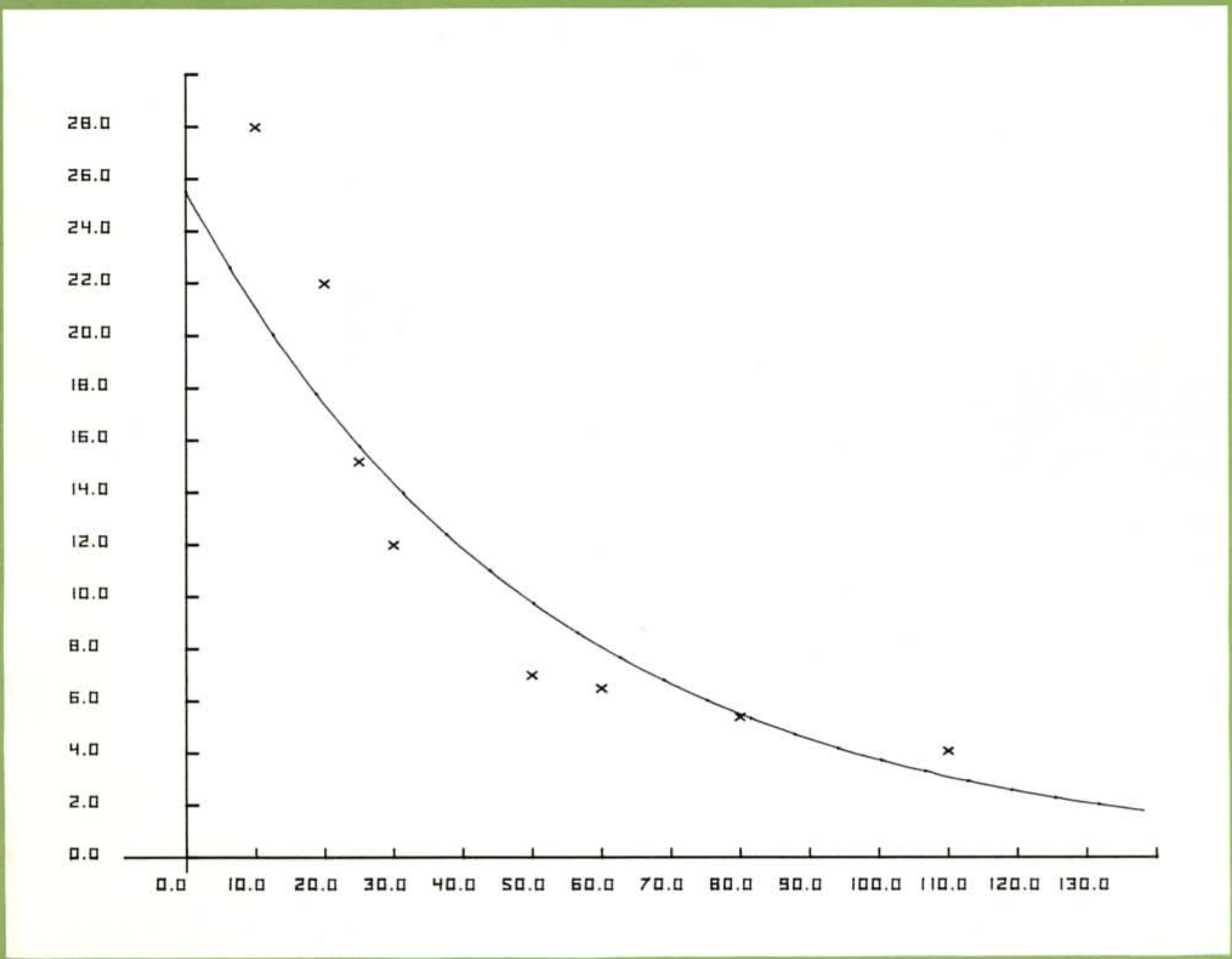
```
          MODL     =
          3.00     #

r²      A     B    =
       .88         #
     25.52         #
-      .02         #
```

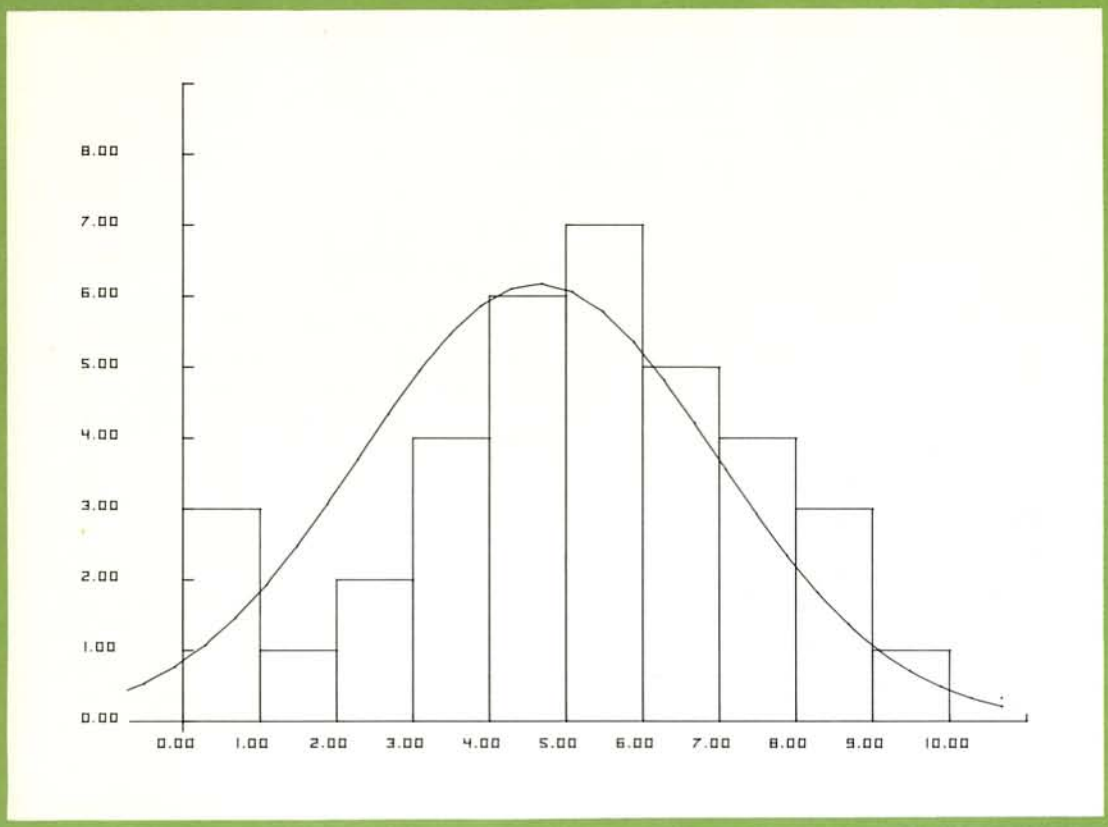
Select Exponential Model (Model 3)

Exponential Fit is y = 25.52e -(.02x) with Correlation of .88

Exponential Curve Fit

Plotted with System 5





Histogram with Normal Curve Overlay

Plotted with System 5

```
        CLEAR

      PRGM
        1.00      #

       11.00      #
         .00      #
        1.00      #


        9.00      #
         .00      #
        1.00      #

          A1      =
         .00      #
         .00      #
```

Labeling Axes using Program 1

Select Single Variable

```
V1    .......
```

```
          OF      =
         .00      #

        C E L=
        1.00      #
```

Establish Histogram Offset and Cell Width

```
        1.00      #
        2.00      #
        3.00      #
        4.00      #
        5.00      #
        6.00      #
        7.00      #
        8.00      #
        9.00      #
        8.00      #
        7.00      #
         .00      #
        6.00      #
        5.00      #
```

```
        4.00      #
        3.00      #
        2.00      #
         .00      #
        3.00      #
        4.00      #
        5.00      #
        6.00      #
        7.00      #
        6.00      #
        5.00      #
        4.00      #
        3.00      #
         .00      #
        4.00      #
        5.00      #
        6.00      #
        5.00      #
        4.00      #
        5.00      #
```

Histogram Data

```
          HG
        1.00      #
         .00      #
        3.00      #
        8.33      #

        2.00      #
        1.00      #
        1.00      #
        2.78      #

        3.00      #
        2.00      #
        2.00      #
        5.56      #

        4.00      #
        3.00      #
        4.00      #
       11.11      #
```

Histogram Cell Data:

- Cell Number
- Lower bound of cell
- Frequency
- Relative % frequency

```
        5.00      #
        4.00      #
        6.00      #
       16.67      #

        6.00      #
        5.00      #
        7.00      #
       19.44      #

        7.00      #
        6.00      #
        5.00      #
       13.89      #

        8.00      #
        7.00      #
        4.00      #
       11.11      #

        9.00      #
        6.00      #
        3.00      #
        8.33      #

       10.00      #
        9.00      #
        1.00      #
        2.78      #
```

```
        CLEAR

      PRGM
        4.00      #
```

Select Program 4 to draw Normal Curve Overlay

```
          N       =
       36.00      #

          x̄       =
        4.64      #

         s1       =
        2.33      #
```

Basic Statistics of Input Data

Statistics Calculations at a Keystroke

HISTO

Calculates complete histogram on data set. Resulting printout includes cell number, lower bound of cell, number of occurrences in cell, relative percent frequency of cell.

OFFSET WIDTH

Used to establish cell width and offset for histograms.

LINEAR

Completes linear curve fit calculation using least squares technique. Prints out A, B, and correlation coefficient r^2 for straight line $y = A + Bx$.

PARA

Completes parabolic curve fit calculation using least squares technique. Prints A, B, C and correlation coefficient r^2 for parabola $y = A + Bx + Cx^2$.

Ŷ EVAL

Given an x value, projects the corresponding y value based on the last curve fit completed.

BASIC STAT

Calculates and prints number of entries, mean, and standard deviation. May be pressed during any analysis in order to review data.

DATA ENTRY DELETE

Used for data entry or correction for all calculations. All data are printed as entered. Erroneous data may be deleted at any time.

t CHANGE SAMPLE

Calculates t for both paired and unpaired data. CHANGE SAMPLE key used to change from one data array to the next.

VAR #

Initializes the calculator and establishes the number of variables used in the analysis.

RECALL

Used to recall intermediate statistical quantities stored inside the Model 5; for example, sums of squares, sums of cross products, cell contents, etc.

PLOT

Plots last curve fit or histogram completed using scale factors established using AXES key.

CHAR #

Selects one of eight available characters for point plotting.

AXES

Establishes plotting scale for x and y axes; also establishes "tic mark" interval for drawing axes.

System 1

BASIC STAT CALCULATOR

- printer
- built-in stat keys to calculate:
  - mean, standard deviation of single data array.
  - means, standard deviations, correlation coefficient of 2-variable array.
  - best fit straight line of the form $y = A + Bx$.
  - best fit parabola of the form $y = A + Bx + Cx^2$.
  - ten cell histogram including frequency and relative percent frequency.
  - students t for both grouped and ungrouped data.

System 2

BASIC STAT CALCULATOR WITH DISPLAY

- printer
- same calculations as System 1
- 10 character eight emitting diode display.

System 3

PLOTTING STAT CALCULATOR

- compatible with HP 9862 Plotter (ordered separately)
- plots curve fits and histograms with calibrated axes.
- printer
- same calculations as System 1
- display

System 4

EXPANDED STAT CALCULATOR

- calculation of best fit power curve $y = Ax^B$
- calculation of best fit exponential curve $y = Ae^{Bx}$
- calculation of best fit logarithmic curve $y = A + B\log x$
- calculation of one-way analysis of variance
- same calculations as System 1
- printer
- display

System 5

PLOTTING EXPANDED STAT CALCULATOR

- compatible with HP 9862 Plotter (ordered separately)
- plots curve fits and histograms with calibrated and labeled axes.
- plots normal curve overlays for histograms
- same calculations as System 1 and System 4
- printer
- display

GENERAL SPECIFICATIONS

Arithmetic:
Add, subtract, multiply, divide

Miscellaneous:
%, 1/x, x/12, ln x, log x, e^x raise number to a power, grand total accumulation

Range: Max 10^{98}, Min -10^{-98}

Storage:
1 storage location
1 accumulating register
(Systems 4 and 5 have 30 data storage locations)

Accuracy:
All calculations made to 10 significant digits.

Decimal Point:
Fixed or floating. Display or print up to 6 places to right of decimal. Print total of 10 digits plus sign.

Algebraic Notation:
Algebraic notation used for all calculations. Parenthesis operation built-in.

Operating Temperature:
0 - 45° C

Power:
117v ± 10%
230v ± 10%
} 48 - 66 Hz

Weight:
13 lbs., 8 oz. (6.12 Kg)

Dimensions:
10.9 inches wide (27.6 cm)
15.5 inches deep (39.3 cm)
5.5 inches high (14 cm)

For more information, call your local HP Sales Office or **East** (201) 265-5000 • **Midwest** (312) 677-0400 • **South** (404) 436-6181 • **West** (213) 877-1282. Or write: **Hewlett-Packard, Calculator Products Division,** P.O. Box 301, Loveland, Colorado 80537. In **Europe:** P.O. Box 85, CH-1217 Meyrin 2, Geneva, Switzerland; **Canada:** 275 Hymus Boulevard, Pointe Claire, 730, Quebec; **Japan:** YHP, 1-59-1, Yoyogi, Shibuya-Ku, Tokyo, 151; Other areas of the world: **HP International,** 3200 Hillview Ave., Palo Alto, California 94304.

Printed in U.S.A.
47330M

5952-2365