

PURPOSE This program performs a least squares curve fit on X, Y data. Curves for 25 equations are fitted. Equation coefficients, Correlation Coefficient, and Best Fit are computed. For any of the 25 equations, predictions for Y can be calculated.

REFERENCE CURVE FITTING FOR PROGRAMMABLE CALCULATORS by William M. Kolb Published by: IMTEC P. O. Box 1402 Bowie MD 20716

WARNING A LINEARIZING technique is applied to various equations so that and the resulting equations are of the general form: Y=A+B\*X

DISCLAIMER This means that sum of squares of errors in Y are not minimized, but the sum of squares of the linearized variable are minimized.

The Linear, Parabolic, Cubic and Hyperbolic equations are linear in the parameters so this reservation does not apply to those curves. Reservation applies to equations with LN, EXP or POWERS.

I. Definitions

25 EQUATIONS FITTED USING THIS APPLICATION

- 1. Y = A + B\*X STRAIGHT LINE
2. Y = B\*X STRAIGHT LINE THROUGH ORIGIN
3. Y = 1/(A + B\*X) RECIPROCAL OF STRAIGHT LINE
4. Y = A + B\*X + C/X COMBINED LINEAR AND RECIPROCAL
5. Y = A + B/X HYPERBOLA
6. Y = X/(A\*X + B) RECIPROCAL OF A HYPERBOLA
7. Y = A + B/X + C/X^2 SECOND ORDER HYPERBOLA
8. Y = A + B\*X + C\*X^2 PARABOLA
9. Y = A\*X + B\*X^2 PARABOLA THROUGH ORIGIN
10. Y = A\*X^B POWER
11. Y = A\*B^X MODIFIED POWER
12. Y = B^(1/X) ROOT
13. Y = A\*X^(B\*X) SUPER GEOMETRIC
14. Y = A\*X^(B/X) MODIFIED GEOMETRIC
15. Y = A\*e^(B\*X) EXPONENTIAL
16. Y = A\*e^(B/X) MODIFIED EXPONENTIAL
17. Y = A + B\*ln(X) LOGARITHMIC
18. Y = 1/(A + B\*ln(X)) RECIPROCAL OF LOGARITHMIC
19. Y = A\*(B^X)\*X^C HOERL FUNCTION
20. Y = A\*(B^(1/X))\*X^C MODIFIED HOERL FUNCTION
21. Y = A\*e^(((X-B)^2)/C) GAUSSIAN DISTRIBUTION
22. Y = A\*e^(((ln(X)-B)^2)/C) LOGNORMAL DISTRIBUTION
23. Y = A\*(X^B)\*(1-X)^C BETA DISTRIBUTION
24. Y = A\*((X/B)^C)\*e^(X/B) GAMMA DISTRIBUTION
25. Y = 1/(A\*(X+B)^2 + C) CAUCHY DISTRIBUTION

NOTES:

- A. Values of X and Y may be positive, negative or zero.
B. Only maximum 255 pairs of X and Y values can be used.
C. Some data pairs are ignored if undefined result occurs.
D. A LINEARIZING technique is applied to various equations so that the resulting equations are of the general form: Y=A+B\*X. This means that sum of squares of errors in Y are not minimized, but the sum of squares of the linearized variable are minimized.
E. The Linear, Parabolic, Cubic and Hyperbolic equations are linear in the parameters so this reservation does not apply to those curves. Reservation applies to equations with LN, EXP or POWERS.

II. General Information

Analyst : Any\_Name
Agency or Company : Fazio\_Engineerware
Date performed : 30February2017
Time performed : 10am
Comment : Project\_1A

Step 1 - Input Data

III. Data Entered by User

Total number of (X,Y) pairs = 9
Will Y value be estimated? : Yes
Value of X to estimate Y = 0.25

Table with 3 columns: Pair, X, Y. Contains 9 data points from (0.10, 4.00) to (0.90, 20.00).

Step 2 - Output

IV.1 Sums and Sums of Squares

FAZFIT - SUMS AND SUMS OF SQUARES

Table listing various statistical sums for N=9, including Sigma[xi], Sigma[x2i], Sigma[yi], Sigma[y2i], Sigma[xiyi], Sigma[x2iyi], Sigma[x3i], Sigma[x4i], Sigma[1/xi], Sigma[1/x2i], Sigma[1/yi], Sigma[1/y2i], Sigma[1/xiyi], Sigma[1/x3i], Sigma[1/x4i], Sigma[xi/yi], Sigma[yi/xi], Sigma[yi/x2i], Sigma[x2i/yi], Sigma[ln(xi)], Sigma[ln(x2i)], Sigma[ln(yi)], Sigma[ln(y2i)], Sigma[ln(xi)ln(yi)], Sigma[xiy2i], Sigma[ln(xi)/xi], Sigma[xiln(yi)], Sigma[ln(yi)/xi], Sigma[xiln(xi)], Sigma[xiln(x2i)], Sigma[ln(xi)/yi], Sigma[(ln(xi)/xi)^2], Sigma[x2iiln(yi)], Sigma[(ln(xi))^3], Sigma[(ln(xi))^4], Sigma[(ln(xi))^2(ln(yi))], Sigma[(ln(yi)ln(xi))/xi], Sigma[ln(1-xi)], Sigma[(ln(1-xi))^2], Sigma[ln(xi)ln(1-xi)], Sigma[ln(yi)ln(1-xi)].

IV.2 Equation Coefficients, R-Squares and Best Fit

FAZFIT - EQUATION COEFFICIENTS, R-SQUARES AND CORRECTED R-SQUARES

Table with 8 columns: EQN, N, A, B, C, R^2, Adj R^2, EQUATION OF CURVE. Lists 25 equations and their coefficients and R-squared values.

BEST FIT EQUATION IS Equation 4

IV.3 Estimated Y Given X

FAZFIT - ESTIMATED Y GIVEN ENTERED X

Table with 7 columns: EQN, Yest, X, A, B, C, EQUATION OF CURVE. Shows estimated Y values for X=0.25 for each of the 25 equations.

BEST FIT EQUATION IS Equation 4

This concludes FAZFIT 1.00
A Curve Fitting Application