

TFC

T (°C)

99

g(x) —  
"t\_data.txt" using 1:2 +

USE TAYLOR (5.42), (5.45) & (5.63)

BEST ESTIMATE OF T = 98.494 °C

$$\sigma_T = 0.023 \text{ } ^\circ\text{C}$$

$$\sigma_T = \sigma_T / \sqrt{9} = 0.008 \text{ } ^\circ\text{C}$$

$$\bar{T} = 98.494 \pm 0.008 \text{ } ^\circ\text{C}$$



FITTING :  $y = a + bx$

$$a = 98.51 \pm 0.01 \text{ } ^\circ\text{C}$$

$$b = -0.0045 \pm 0.0027 \text{ } ^\circ\text{C/s}$$

Slope = 0  $\Rightarrow$  NO COOLING

Slope is  $\frac{0.0027}{0.0045}$   $\sigma = 0.6$  AWAY FROM ZERO.

FROM APPENDIX D, HARRIS 45% OF TIME, NOT SIGNIFICANT.

98



t (s)

## T 8.22

USE EQS (8.27)

NOTE THAT w/ RE-ORDERING OF EQUALLY SPACED X-VALUES,  $\sum X = \sum X^3 = 0$ .

From NUMBERS IN PROBLEM

$$5A + 10C = 391$$

$$10B = -310$$

$$10A + 34C = 716.00$$

$$A = 87.6 \text{ cm}$$

$$B = -31.0 \text{ cm} / 0.1 \text{ sec} = -3.1 \text{ m/s}$$

$$C = -4.71 \text{ cm} / (0.1 \text{ sec})^2 = -4.7 \text{ m/s}^2$$

$$\begin{aligned} \text{From } y &= A + Bt + Ct^2 \\ &= y_0 + v_0 t - \frac{1}{2} g t^2 \end{aligned}$$

$$y_0 = .876 \text{ m}$$

$$v_0 = B = -3.1 \text{ m/s}$$

$$C = -\frac{1}{2} g = -4.7 \text{ m/s}^2$$

$$\Rightarrow g = 9.4 \text{ m/s}^2$$

T8.27 USE EQ (8.41)

$$y = A f(x) + B g(x)$$

$$= A \cos \omega t + B \sin \omega t$$

$$\omega = 10 \text{ RAD/SEC}$$

FROM THE DATA TABLE 8 USING OUR DEFINITIONS OF  $f(x)$  AND  $g(x)$ :

$$2.2A = 12.2 \text{ cm}$$

$$2.0B = 31.1 \text{ cm}$$

$$\Rightarrow \left\{ \begin{array}{l} A = 5.5 \text{ cm} \\ B = 11.1 \text{ cm} \end{array} \right.$$

PLOT ON NEXT PAGE.

GIVEN THE "EYEBALL" UNCERTAINTY OF A FEW Cms, THE GAP BETWEEN THE PLOTTED DATA POINTS AND THE FITTED CURVE IS NOT SIGNIFICANT.

