Vandermonde Matrix and Graph

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> $X := \langle 1.01, 2.2, 2.9, 4.03, 5.32, 6.22, 8.56, 9.09 \rangle;$

$$X := \begin{bmatrix} 1.01 \\ 2.2 \\ 2.9 \\ 4.03 \\ 5.32 \\ 6.22 \\ 8.56 \\ 9.09 \end{bmatrix}$$

(1)

> $Y := \langle 18.5, 76.2, 150.5, 365, 780, 1265, 3250, 7099 \rangle;$

$$Y := \begin{bmatrix} 18.5 \\ 76.2 \\ 150.5 \\ 365 \\ 780 \\ 1265 \\ 3250 \\ 7099 \end{bmatrix}$$

(2)

> $with(LinearAlgebra):$
> $V := VandermondeMatrix(X, 8, 4);$

$$V := \begin{bmatrix} 1.0 & 1.01 & 1.0201 & 1.030301 \\ 1.0 & 2.2 & 4.84 & 10.648 \\ 1.0 & 2.9 & 8.41 & 24.389 \\ 1.0 & 4.03 & 16.2409 & 65.450827 \\ 1.0 & 5.32 & 28.3024 & 150.568768 \\ 1.0 & 6.22 & 38.6884 & 240.641848 \\ 1.0 & 8.56 & 73.2736 & 627.222016 \\ 1.0 & 9.09 & 82.6281 & 751.089429 \end{bmatrix}$$

(3)

> $VT := Transpose(V);$

(4)

$$VT := \begin{bmatrix} 1.0 & 1.0 & 1.0 & 1.0 & 1.0 & 1.0 & 1.0 & 1.0 \\ 1.01 & 2.2 & 2.9 & 4.03 & 5.32 & 6.22 & 8.56 & 9.09 \\ 1.0201 & 4.84 & 8.41 & 16.2409 & 28.3024 & 38.6884 & 73.2736 & 82.6281 \\ 1.030301 & 10.648 & 24.389 & 65.450827 & 150.568768 & 240.641848 & 627.222016 & 751.089429 \end{bmatrix}$$ **(4)**

> $A := (VT.V)^{-1}.VT.Y;$

$$A := \begin{bmatrix} -1242.33156564229 \\ 1407.45023719201 \\ -398.108305961272 \\ 36.5945494963625 \end{bmatrix}$$ **(5)**

> $P := plot(X, Y, style = point, colour = \text{"black"});$
$$P := PLOT(\dots)$$ **(6)**

> $Q := plot(A[4]t^3 + A[3]t^2 + A[2]t + A[1], t = 0..10, colour = \text{"black"});$
$$Q := PLOT(\dots)$$ **(7)**

> $plots[display](P, Q);$