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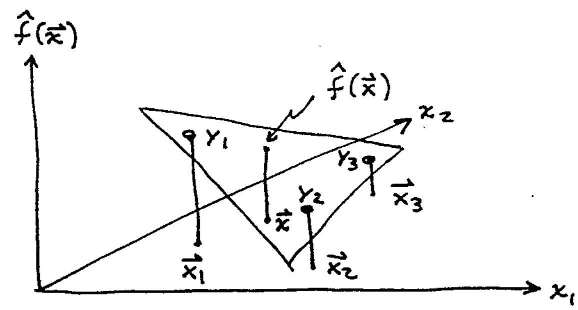
tool: Having found the vertices of the triangle containing $\vec{x}$, we find the plane passing through the y values for those vertices by solving a matrix equation.



The equation for the plane has the form

$$y = a_0 \cdot 1 + a_1 x_1 + a_2 x_2, \quad \text{or} \quad \vec{a} \circ \vec{x}_+ = y$$

where $\vec{x}_+ = (1, x_1, x_2)$ and $\vec{a} = (a_0, a_1, a_2)$.

Since the plane passes through the data points we have

$$\vec{a} \circ \vec{x}_{1+} = y_1$$
$$\vec{a} \circ \vec{x}_{2+} = y_2$$
$$\vec{a} \circ \vec{x}_{3+} = y_3$$

or
$$\begin{bmatrix} - & \vec{x}_{1+} & - \\ - & \vec{x}_{2+} & - \\ - & \vec{x}_{3+} & - \end{bmatrix} \begin{bmatrix} | \\ \vec{a} \\ | \end{bmatrix} = \begin{bmatrix} | \\ \vec{y} \\ | \end{bmatrix}$$

or
$$X \quad \vec{a} = \vec{y}$$

Thus,
$$\vec{a} = X^{-1} \vec{y}.$$

Having found $\vec{a}$, we have $\hat{f}(\vec{x}) = \vec{a} \circ \vec{x}_+$.

note: We can compute $\vec{a}$ ahead of time and store them.