

Step-1

We have to find that what words we use to describe the equation $A^T \hat{Ax} = A^T b$, and the matrix $P = A(A^T A)^{-1} A^T$.

The equations $A^T \hat{Ax} = A^T b$ are known in statistics as the normal equations.

That is, solving above equations system, we get a least square solution.

Step-2

$$p = \hat{Ax} = Pb$$

This denotes the projection of b onto the column space is nearest point \hat{Ax} .

The matrix $P = A(A^T A)^{-1} A^T$ is a projection matrix.