

Represent the coefficients (Q, q, γ)

by

$$P = \begin{pmatrix} \gamma & q^T \\ q & Q \end{pmatrix}.$$

Then

$$P \bullet \begin{pmatrix} 1 & x^T \\ x & xx^T \end{pmatrix} = \text{trace} \begin{pmatrix} \gamma + q^T x & * \\ * & q^T x + Q \bullet xx^T \end{pmatrix} \\ = \gamma + 2q^T x + x^T Q x.$$