Charles Liu
304804942
Stats 102B
Disc. 3B
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Task 1 $L = \frac{1}{N}(t - Xw)^T A (t - Xw)$ for $A = \begin{bmatrix} a_1 & & 0 \\ & \ddots & \\ 0 & & a_N \end{bmatrix}$ (diagonal) $\longrightarrow$

$\frac{1}{N}\left[(t^T - w^T X^T) A (t - Xw)\right] \longrightarrow t^T A t - t^T A X w - w^T X^T t A + w^T X^T A X w \longrightarrow$

$L = \frac{1}{N}\left[t^T A t - 2 w^T X^T A t + w^T X^T A X w\right] \xrightarrow[\text{took out (2) by } (\div)]{\text{already}} \frac{\partial L}{\partial w} = 0 - X^T A t + X^T A X \hat{w} = 0 \longrightarrow$

$\boxed{\hat{w} = (X^T A X)^{-1} X^T A t} \longrightarrow$ "solution typed in output file"