Q1.1 (5 points)

1. What is $\delta W(x;p)/\delta p.T$?

$$\delta W(x;p)/\delta p.T = \begin{bmatrix} 1, & 0 \\ 0, & 1 \end{bmatrix}$$

2. What is A and b?

$$A = \left(\frac{\delta l}{\delta x} \quad \frac{\delta l}{\delta y} \right)$$

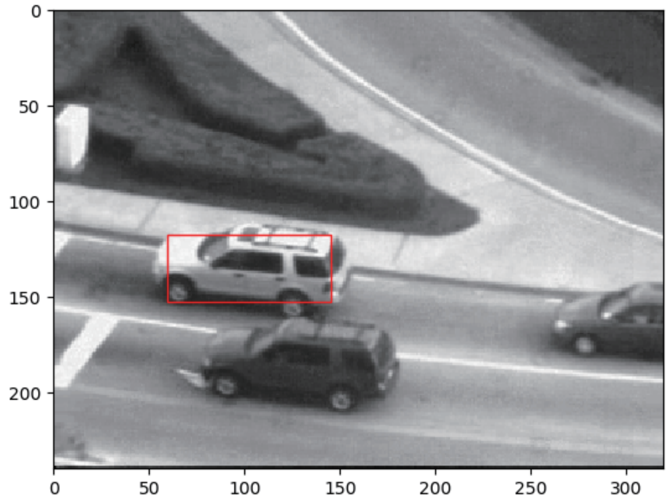
$\ln L_{t+1}(x' + \Delta p)$

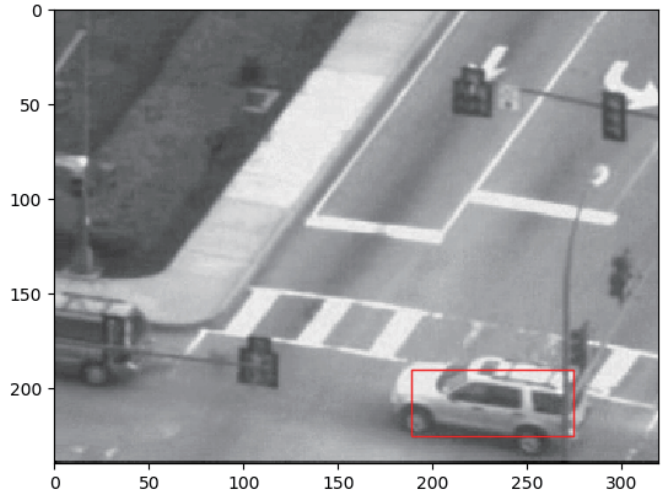
$$B = L_{t+1}(x' + \Delta p) - L_t(x)$$

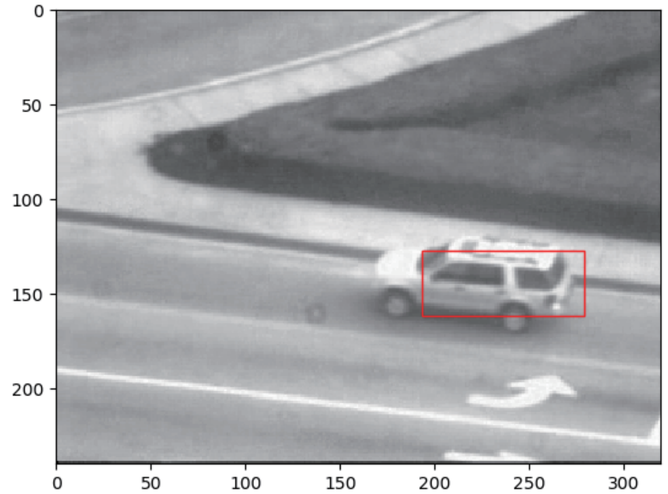
3. What conditions must ATA meet

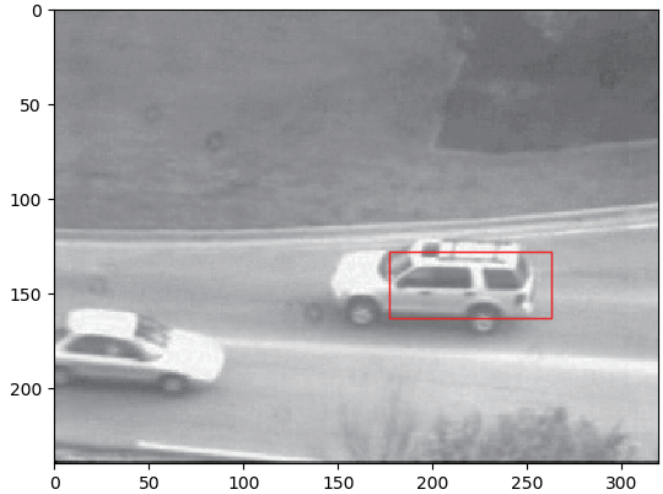
A.T · A should be invertible

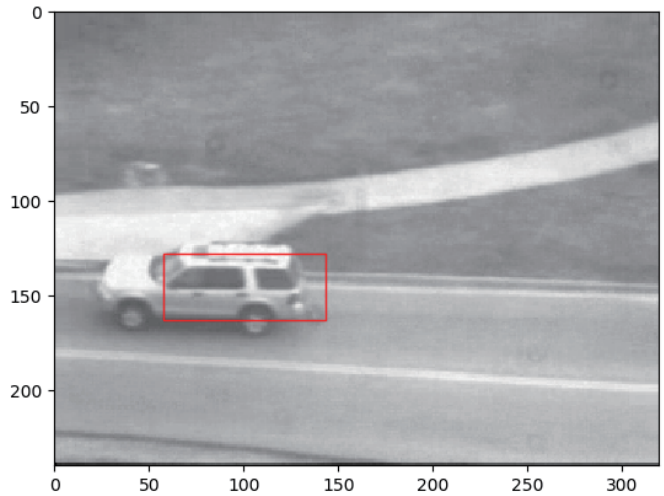
Q1.3 (10 points)



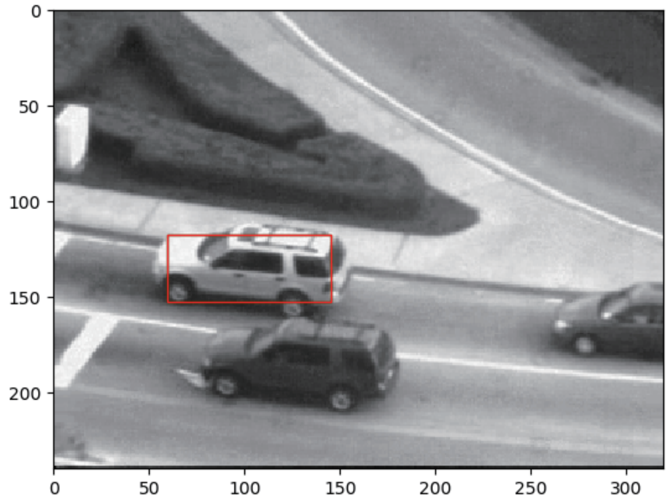


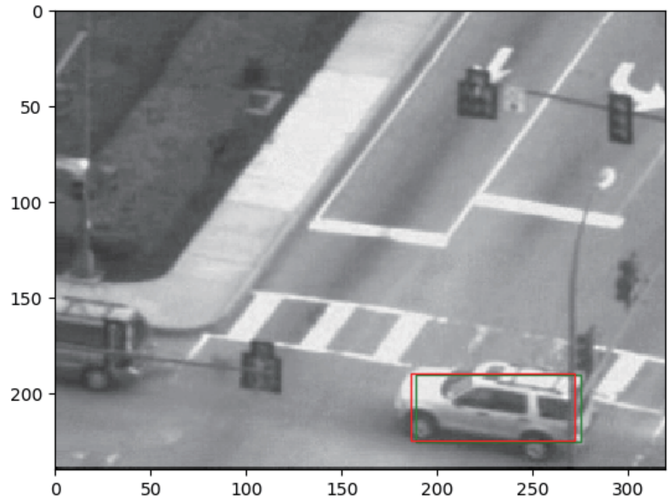


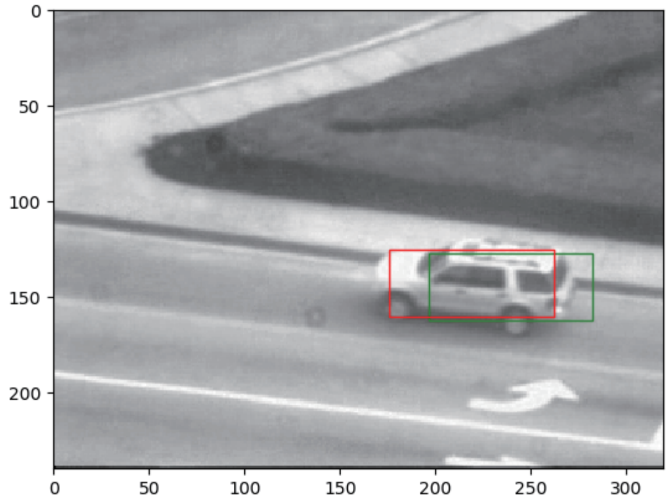




Q1.4 (10 points)



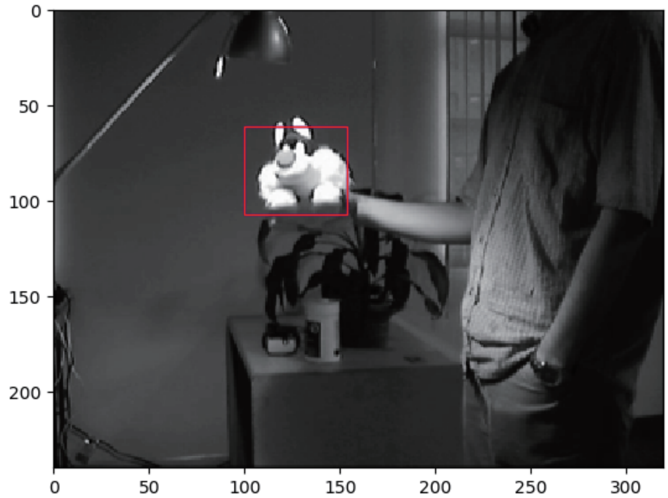


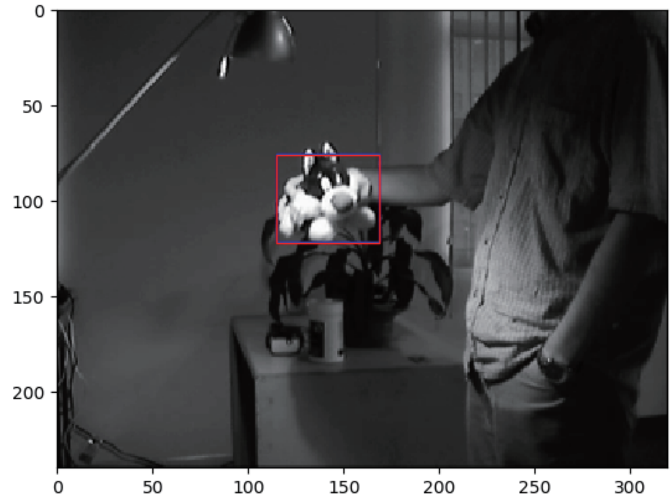


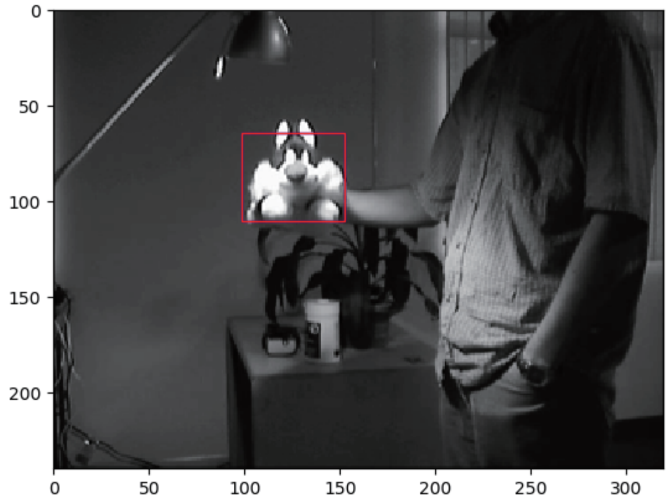
Q2.1 (5 points)

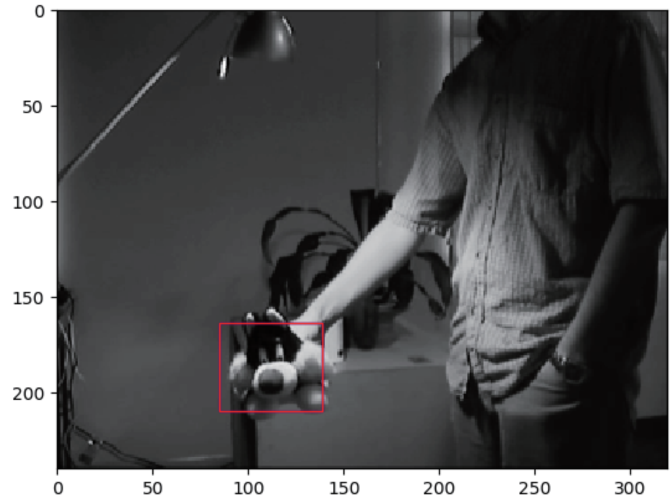
$$w_K = B^{-1}(L_{t+1}(x) - L_t(x))$$

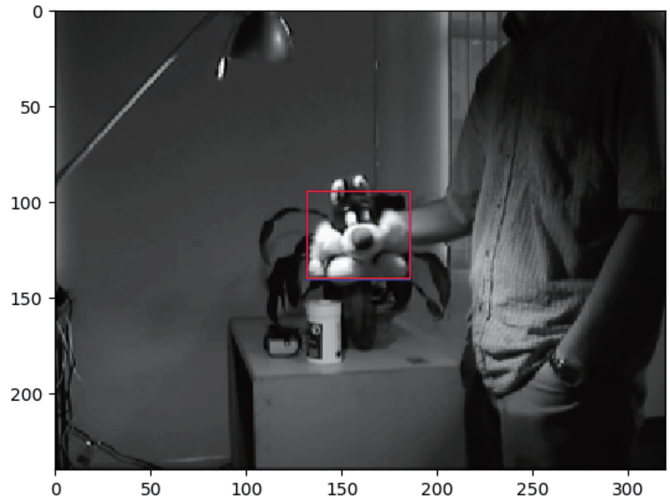
Q2.3 (15 points)



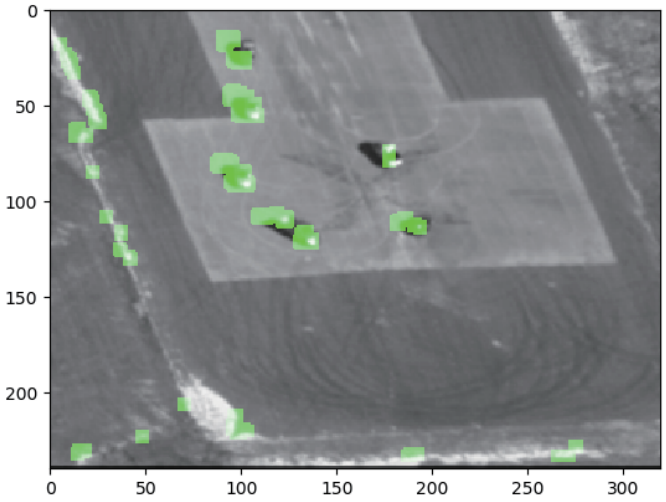


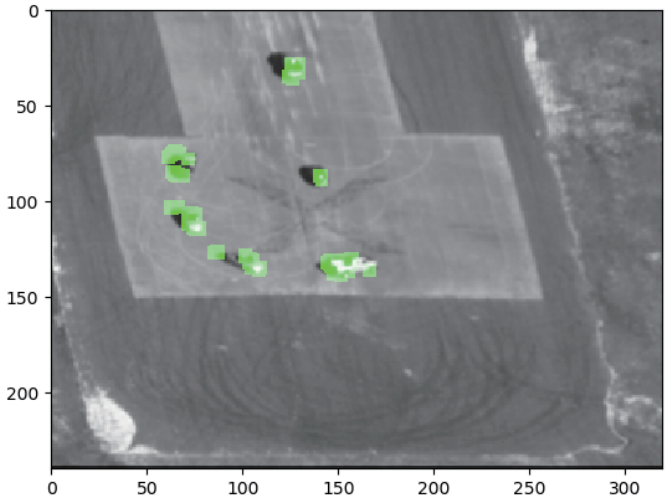


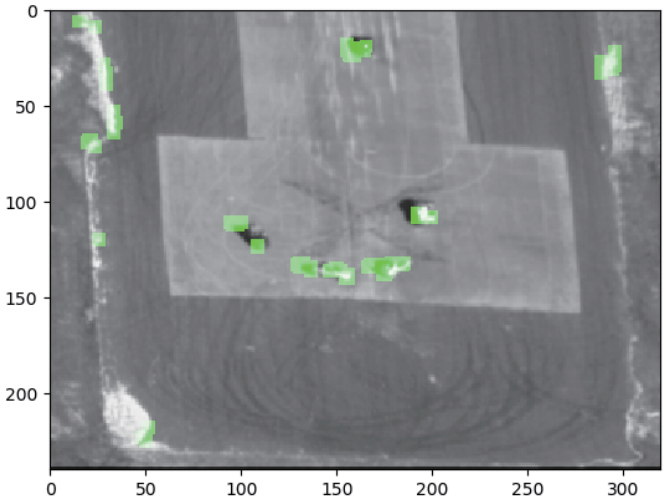


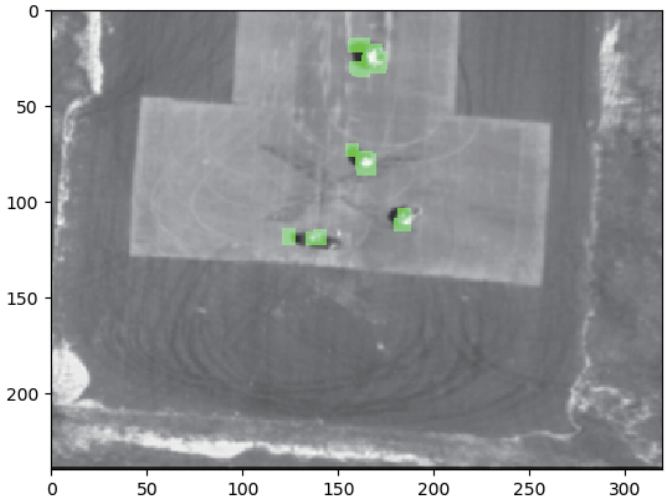


Q3.3 (10 points)





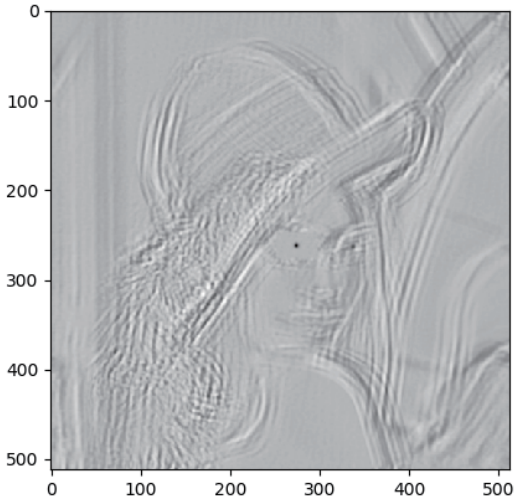




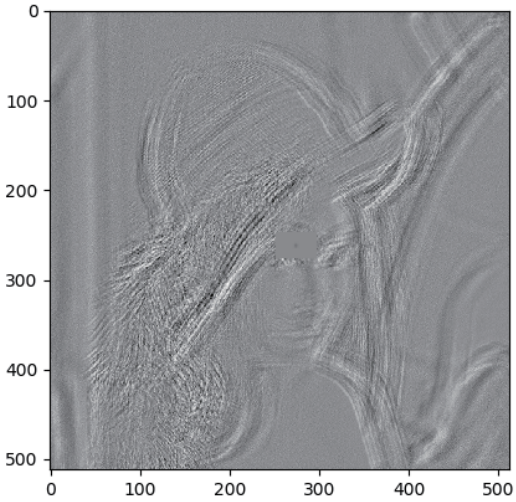
Q4.2 (15 points)

(inv(S) + lambda * I) XY

Q4.3 (15 points)



lambda = 1

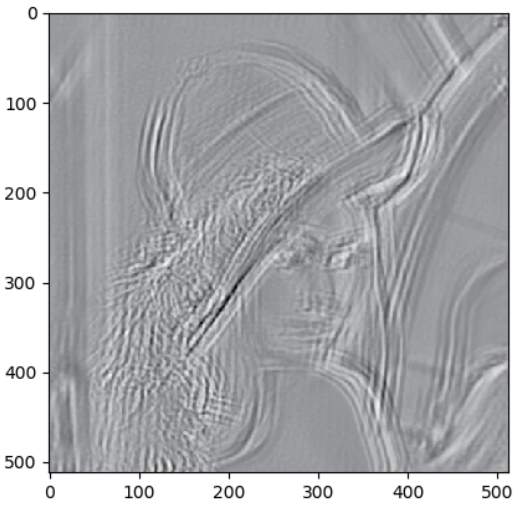


lambda = 0

lambda = 1 is better

because regularization can be used to correct for low-energy frequencies and produce more stable filters

Q4.4 (15 points)



convolution

g_convolution = g_correlation[::-1, ::-1]
inverse the row and col of the filter matrix