

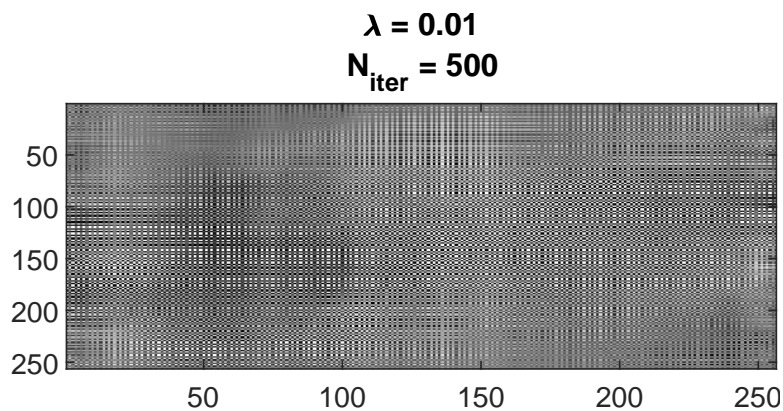
Q4 c

```
include>forward_A.m</include

include>cgconvtik.m</include

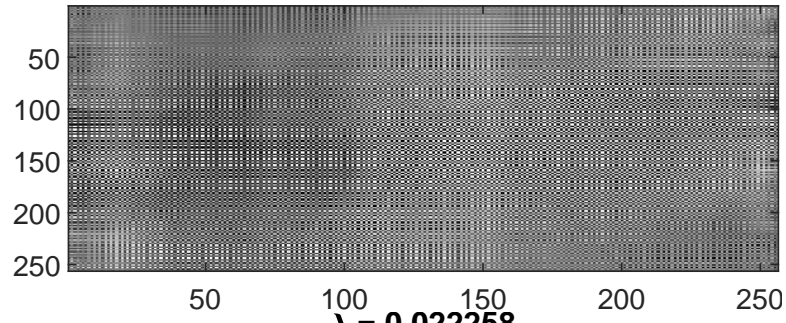

addpath("autoArrangeFigures");
close all; clc; clear;
X = double(imread('cameraman.tif'));
H = gauss2d(15,15,0,0,2,2);
D1 = [-1 0 1]';
D2 = D1';

Y = conv2(X,H,'same');
sigma_s = var(Y(:));
sigma_n = sigma_s * 1e-3;
noise = sigma_n * randn(size(Y));
Y = Y + noise;
n_iter = 500;
x_0 = X;
for lambda = power(10,linspace(-2,log10(20),20))
    estimate = cgconvtik(H, D1, D2, Y, x_0, lambda, n_iter);
    figure
    X_back = reshape(estimate,size(X));
    imagesc(normalize(X_back,'range')), colormap gray
    title(['\lambda = ',num2str(lambda)], ['N_{iter} = ',num2str(n_iter)]])
end
autoArrangeFigures(4,5,1)
```



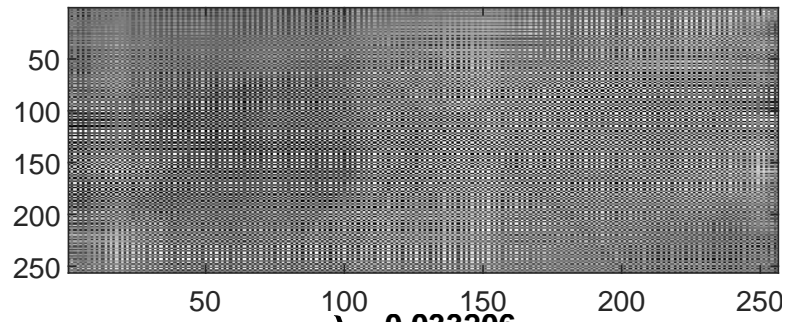
$\lambda = 0.014919$

$N_{\text{iter}} = 500$



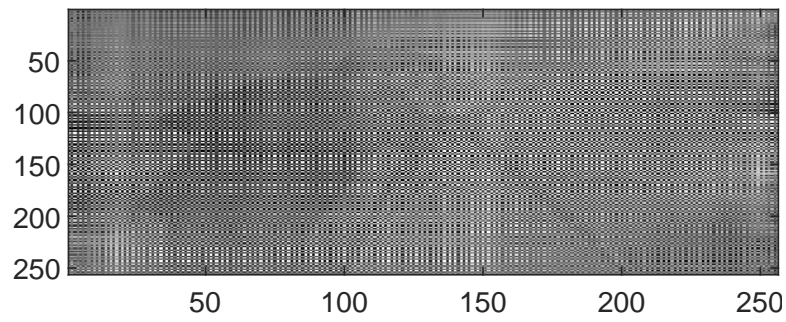
$\lambda = 0.022258$

$N_{\text{iter}} = 500$



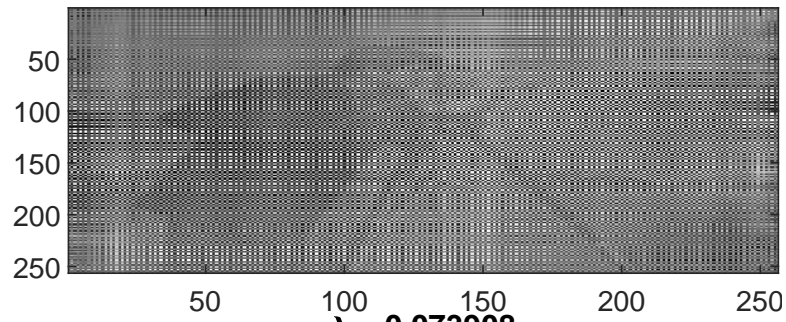
$\lambda = 0.033206$

$N_{\text{iter}} = 500$



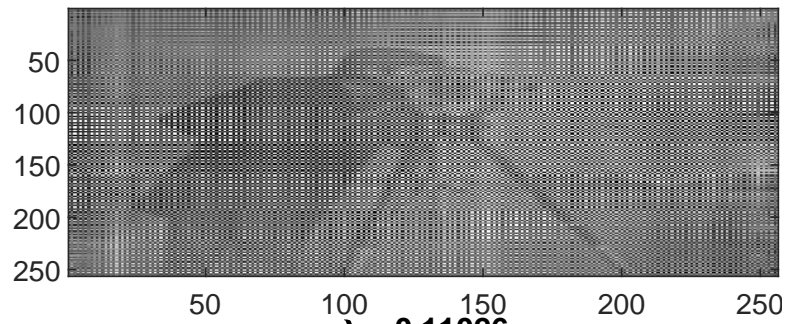
$\lambda = 0.04954$

$N_{\text{iter}} = 500$



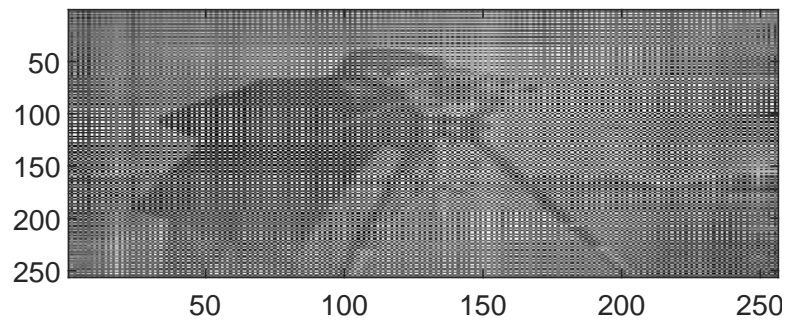
$\lambda = 0.073908$

$N_{\text{iter}} = 500$



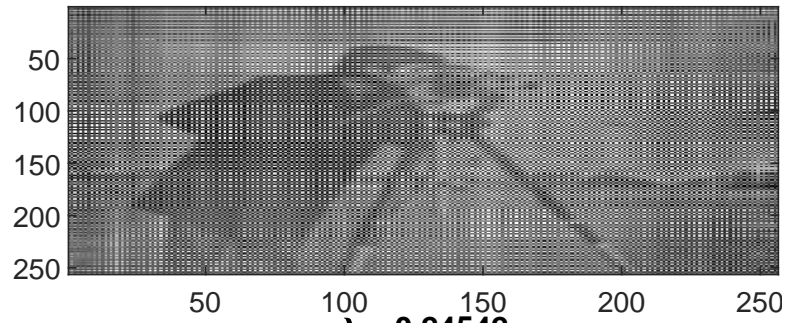
$\lambda = 0.11026$

$N_{\text{iter}} = 500$



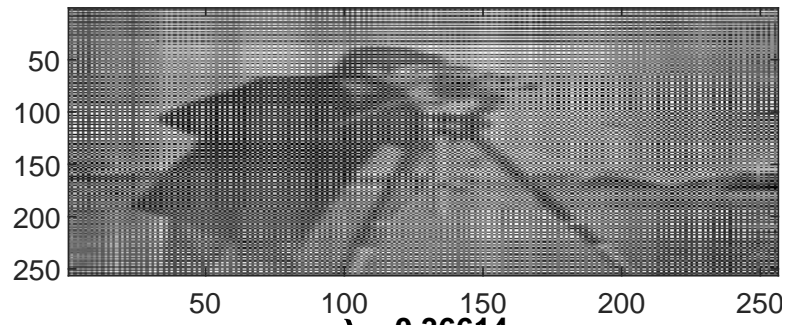
$\lambda = 0.1645$

$N_{\text{iter}} = 500$



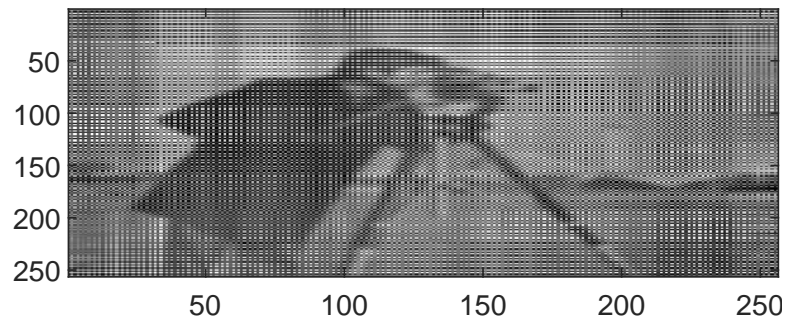
$\lambda = 0.24542$

$N_{\text{iter}} = 500$



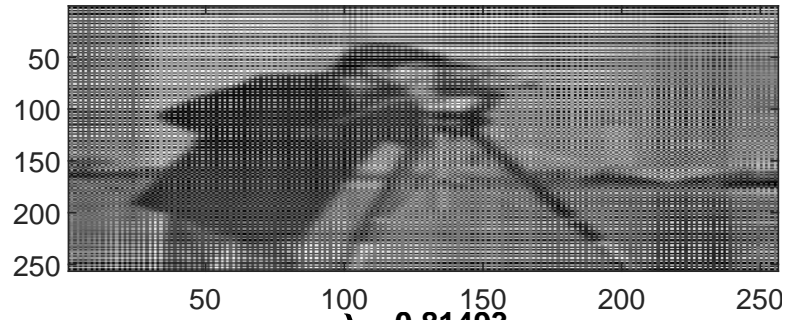
$\lambda = 0.36614$

$N_{\text{iter}} = 500$



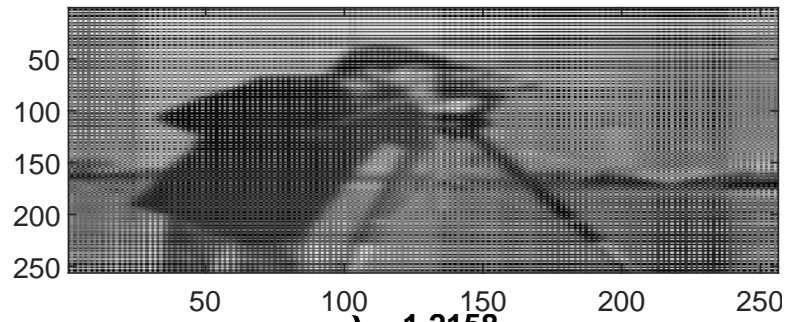
$\lambda = 0.54624$

$N_{\text{iter}} = 500$



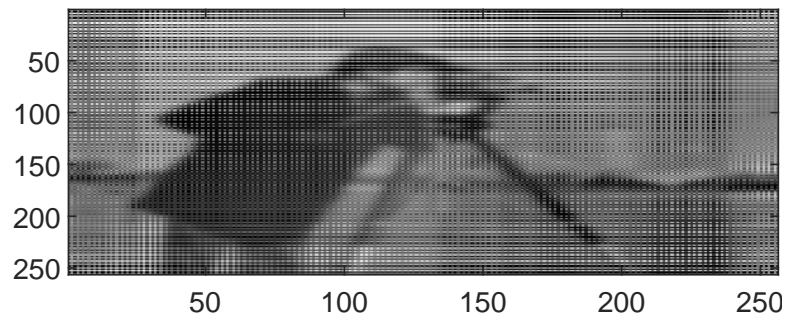
$\lambda = 0.81493$

$N_{\text{iter}} = 500$



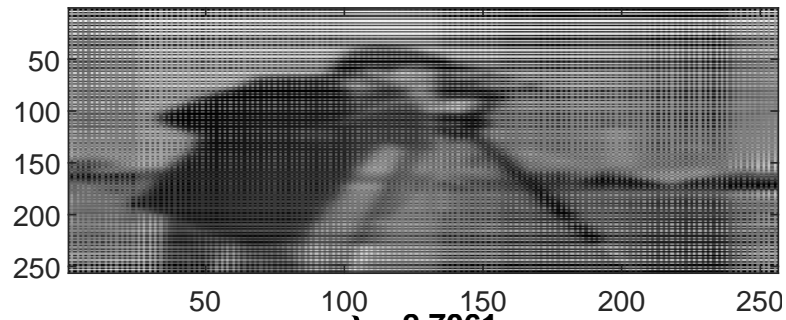
$\lambda = 1.2158$

$N_{\text{iter}} = 500$



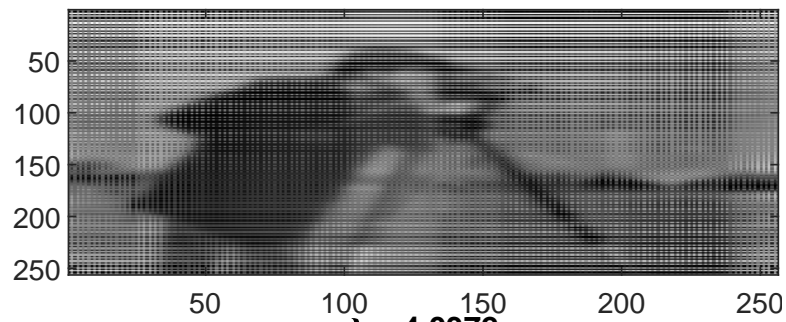
$\lambda = 1.8138$

$N_{\text{iter}} = 500$



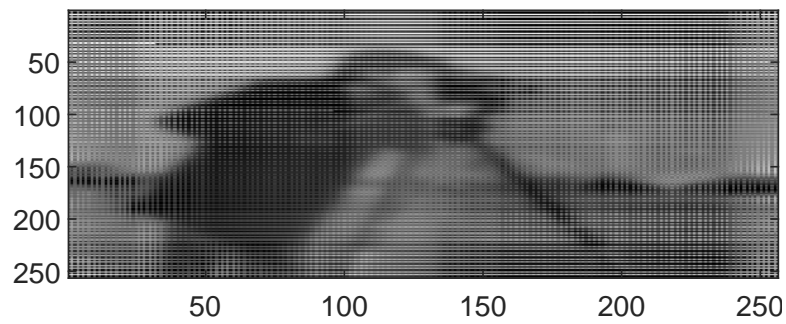
$\lambda = 2.7061$

$N_{\text{iter}} = 500$

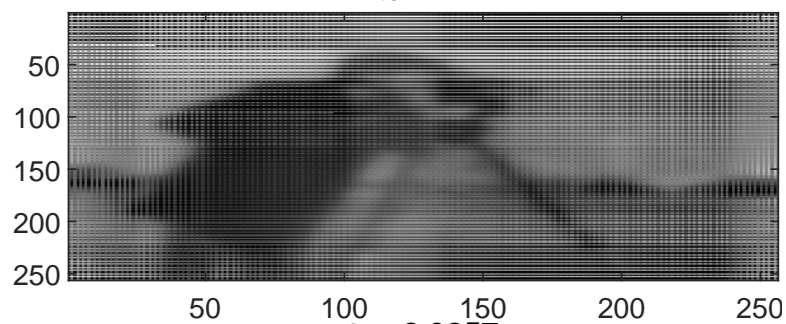


$\lambda = 4.0372$

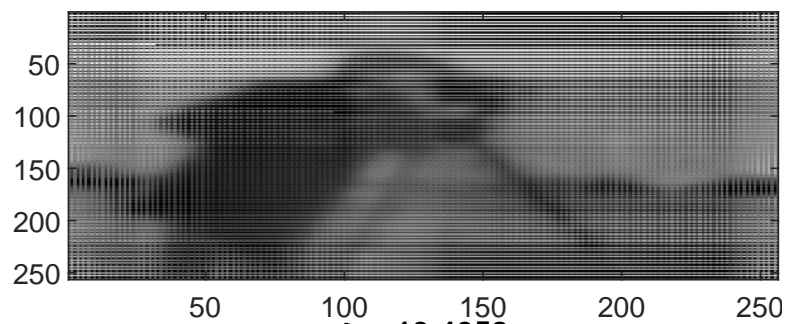
$N_{\text{iter}} = 500$



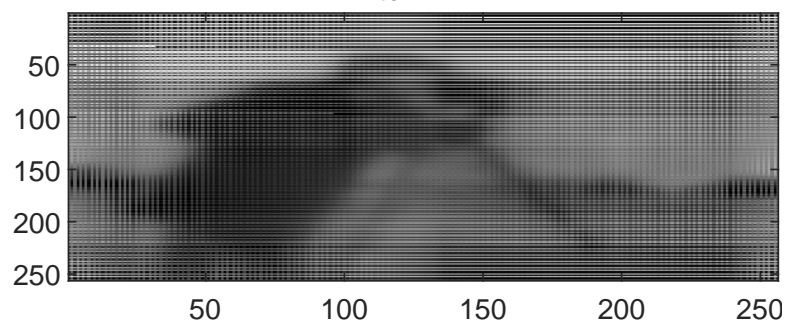
$\lambda = 6.023$
 $N_{\text{iter}} = 500$



$\lambda = 8.9857$
 $N_{\text{iter}} = 500$



$\lambda = 13.4058$
 $N_{\text{iter}} = 500$



$\lambda = 20$
 $N_{\text{iter}} = 500$

