# MIC Assignment-2

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## Contents

# 1    Question 1
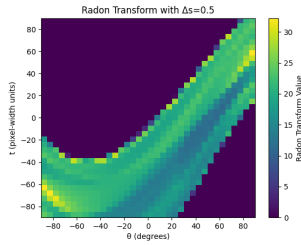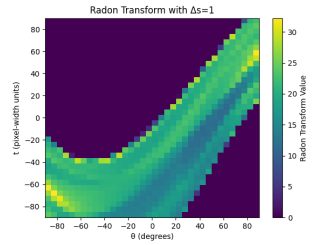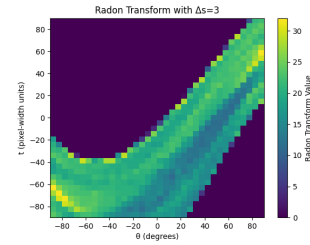


$$\Delta s = 0.5 \qquad\qquad \Delta s = 1 \qquad\qquad \Delta s = 3$$

# 2    Question 2



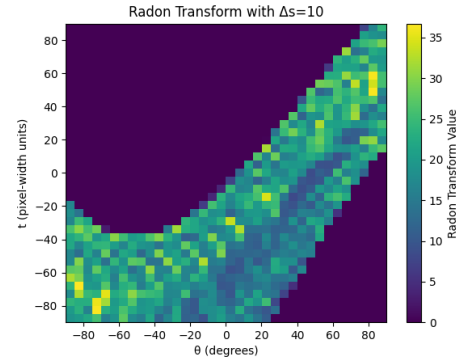**No Filtering**
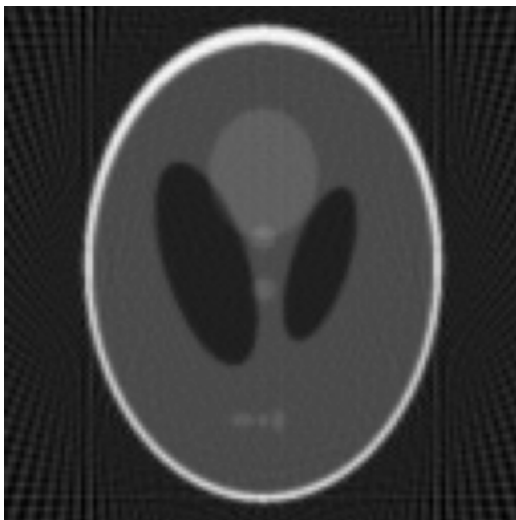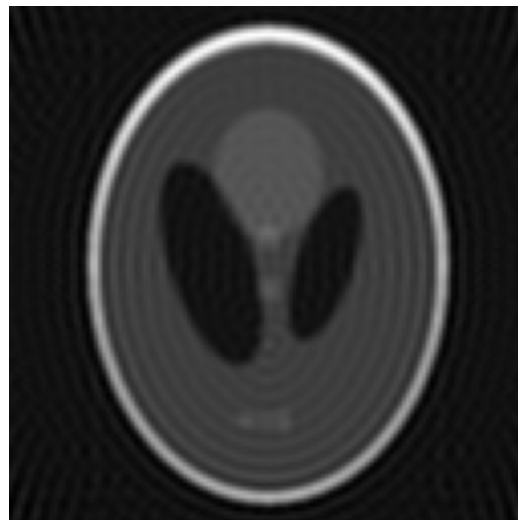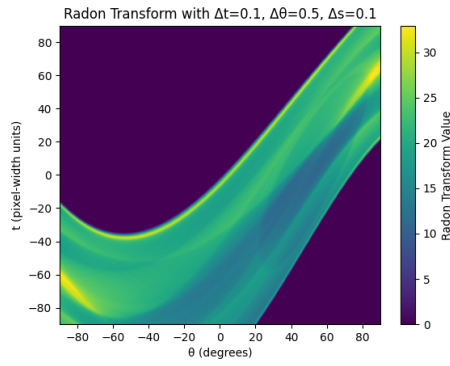


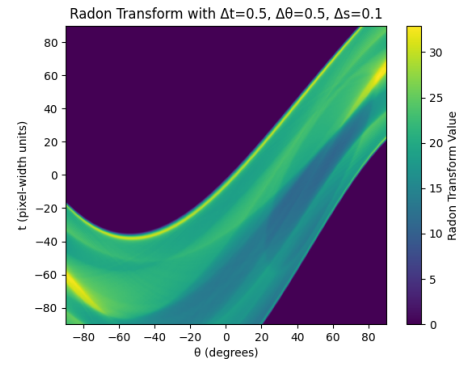Ram-Lak ($L = 0.5$)                                Ram-Lak ($L = 0.25$)

$\Delta s = 3$
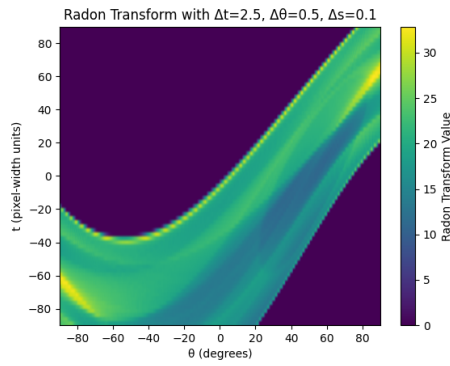


$\Delta s = 10$
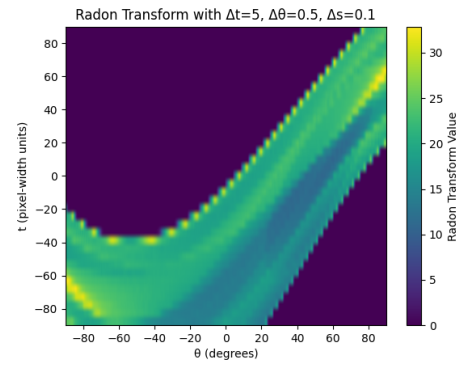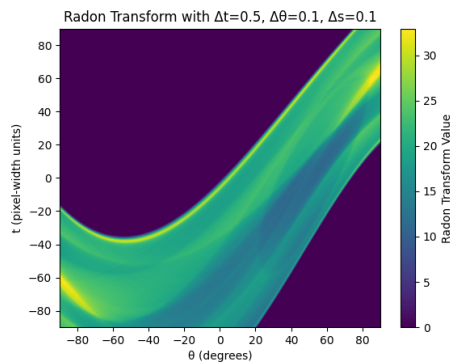


$\Delta t = 0.1$



$\Delta t = 0.5$


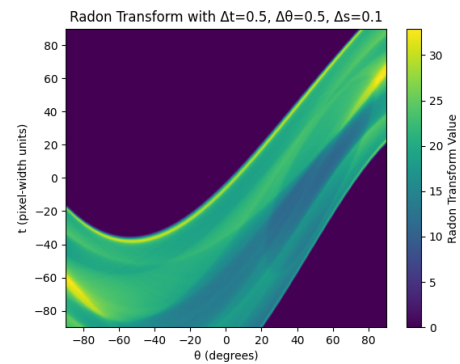
$\Delta t = 2.5$



$\Delta t = 5$



$\Delta \theta = 0.1$

$\Delta \theta = 0.5$

Shepp-Logan ($L = 0.5$)                                    Shepp-Logan ($L = 0.25$)
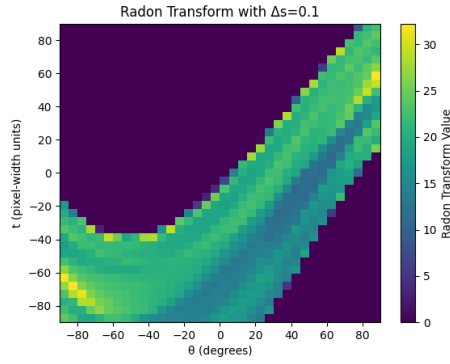
Cosine ($L = 0.5$)                                         Cosine ($L = 0.25$)
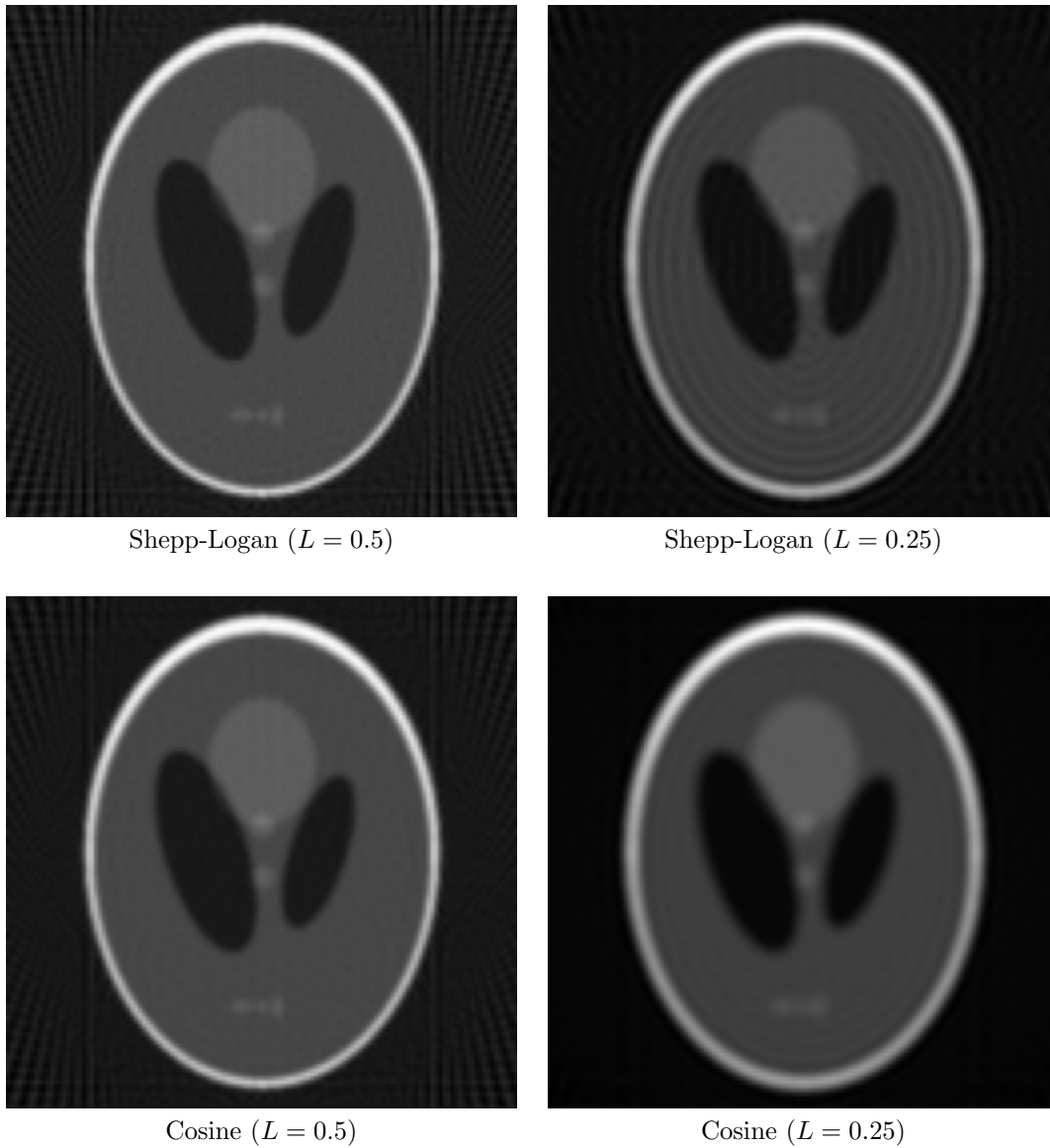
Figure 2: Comparison of reconstructed images using different filters and cutoff frequencies.
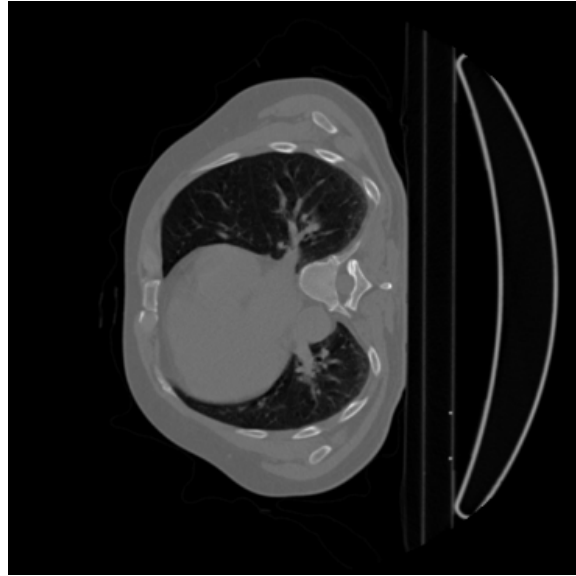
# 3   Question 3



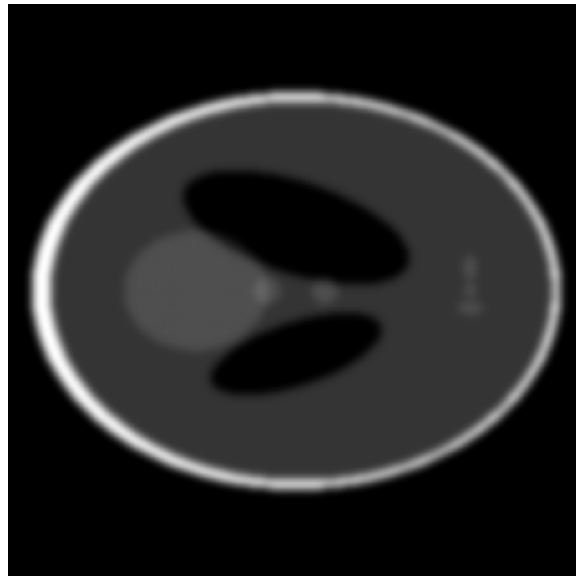Figure 3: Original Image - Chest CT
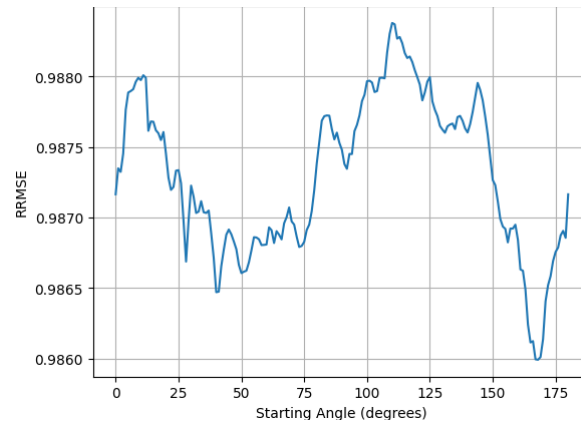


Figure 4: Original Image - Phantom
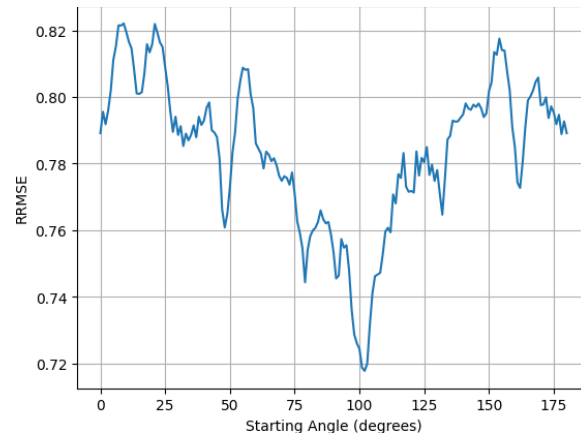
Figure 5: RRMSE Plot - Chest CT



Figure 6: RRMSE Plot - Phantom

Minima of RRMSE for Chest CT is an RRMSE of 0.9859919140151212 at 168 degrees. For phantom, it is an RRMSE of 0.7176981638852817 at 102 degrees.
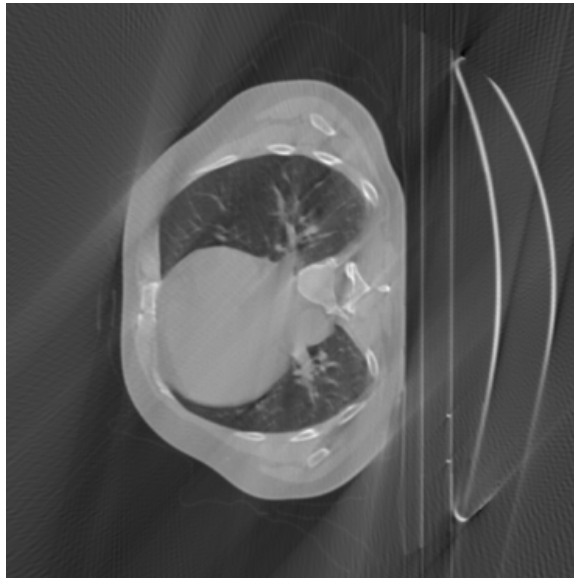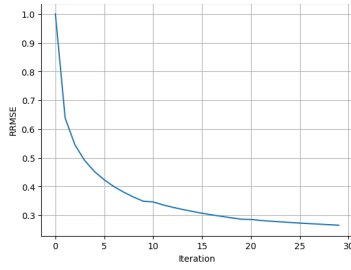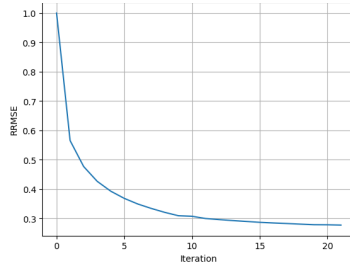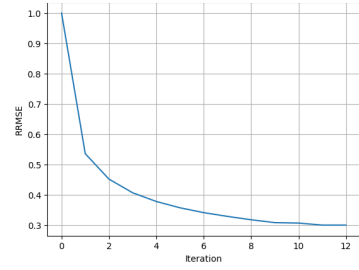
Figure 7: Optimal Reconstruction - Chest CT



Figure 8: Optimal Reconstruction - Phantom

# 4   Question 4



(a) $\lambda = 0.1$

(b) $\lambda = 0.2$

(c) $\lambda = 0.3$
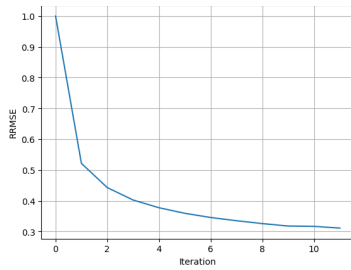
(d) $\lambda = 0.4$
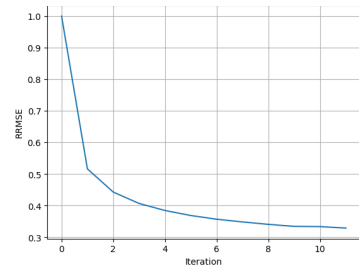
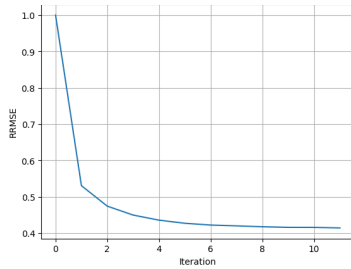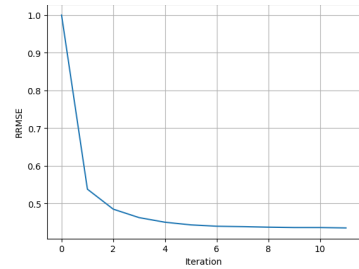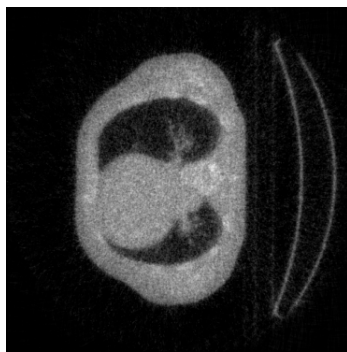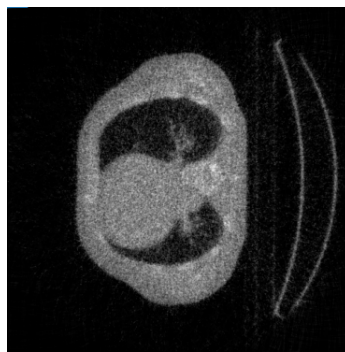(e) $\lambda = 0.5$

Figure 9: RRMSE plots for $\lambda$ from 0.1 to 0.5.



(a) $\lambda = 0.6$

(b) $\lambda = 0.7$
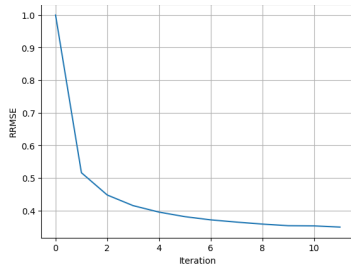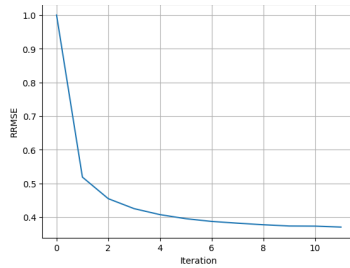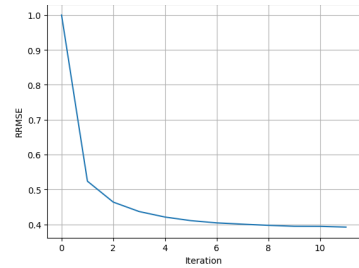
(c) $\lambda = 0.8$

(d) $\lambda = 0.9$

(e) $\lambda = 1.0$

Figure 10: RRMSE plots for $\lambda$ from 0.6 to 1.0.
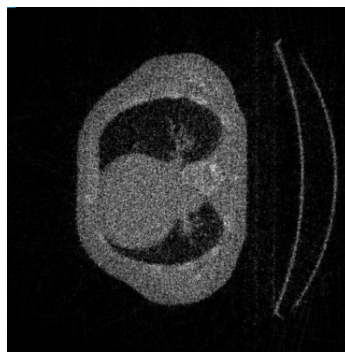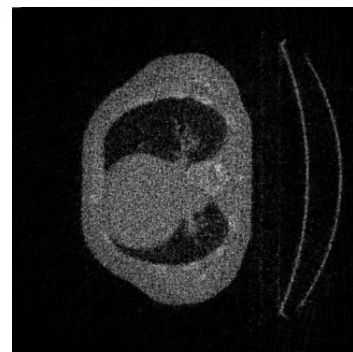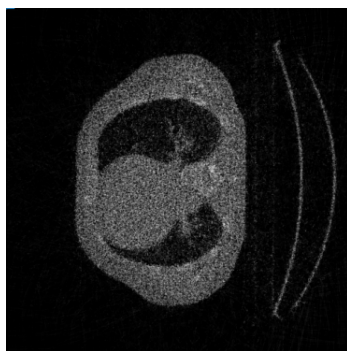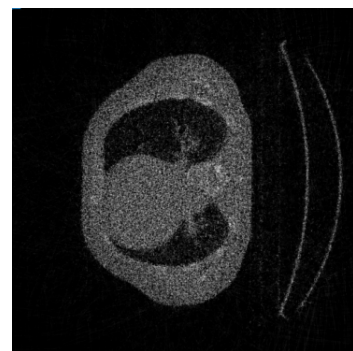
(a) $\lambda = 0.1$

(b) $\lambda = 0.2$

(c) $\lambda = 0.3$

(d) $\lambda = 0.4$

(e) $\lambda = 0.5$

Figure 11: Reconstructed images for $\lambda$ from 0.1 to 0.5.
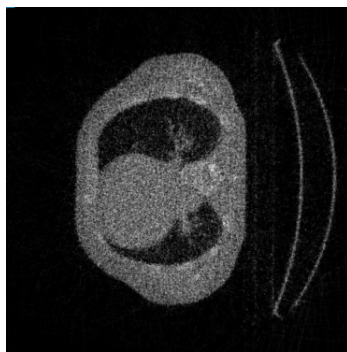
(a) $\lambda = 0.6$
(b) $\lambda = 0.7$
(c) $\lambda = 0.8$

(d) $\lambda = 0.9$
(e) $\lambda = 1.0$

Figure 12: Reconstructed images for $\lambda$ from 0.6 to 1.0.