DIP Assignment 3 | 20161039

Q2.

$$Im\_new = (-1)^{x+y} \times (Real(IDFT((Complex\ conjugate\ (DFT((-1)^{x+y} \times Im))))))$$

From observation,

Im_new = water_image (mirror_image (Im))

= the image obtained by reflecting Im both along x-axis and y-axis

= the image obtained by reflecting Im wrt. the origin

Now we know that complex conjugate of a complex number $c = a + jb$ is $\bar{c} = a - jb$ ——— (1)

$$Im\_new = \mathcal{F}^{-1}[F^*(u,v)]$$

$$= \sum_{x=0}^{M-1} \sum_{y=0}^{N-1} F(u,v)\, e^{-j2\pi(ux/M + vy/N)}$$

$$= \sum_{x=0}^{M-1} \sum_{y=0}^{N-1} F(u,v)\, e^{j2\pi(u(-x)/M + v(-y)/N)}$$

$$= f(-x,-y) \qquad (\text{where } Im = f(x,y))$$

= mirror of $Im = f(x,y)$ about the origin.