Math 155, Vese
Homework # 3   Due on Wednesday, May 12

[1] Show that the Fourier transform and its inverse are linear processes.

[2] Compute in continuous variables the Fourier transform of the function defined by:
$$f(x) = \begin{cases} A, & \text{if } 0 \le x \le K, \\ 0, & \text{otherwise,} \end{cases}$$
where A and K are positive constants. Evaluate $F(0)$.

[3]   Show that if a filter transfer function is real and symmetric (i.e. if $H(u,v) = \overline{H(u,v)} = \overline{H(-u,-v)} = H(-u,-v)$), then the corresponding spatial domain filter $h(x,y)$ is also real and symmetric.

[4]
(a) Implement the Gaussian lowpass filter in Eq. (4.3-8), using a radius=15, and apply the algorithm to the attached image.
(b) Highpass the input image used in (a), using a highpass Gaussian filter of radius $D_0 = 15$.