We want to take a picture of something underwater. Attached "Ref" file contains the data cube of the field of view. You can think of it as individual pixels, i.e. in the matrix provided, (x,y) represent the location of the matrix and third dimension provides the spectrum. For example: Ref(1,1,:) will give you the reflection spectrum of the pixel in the location of (1,1). Let’s imagine that we have two different light sources. We are going to use the "sun" and in the other case, a "Halogen lamp" as the light source. (You can find the spectrum of these light sources using the blackbody approximation available on the course website. $T_{Sun} = 5000k$, $T_{Halogen} = 3500k$)

a) With the provided reflection spectrum and light sources, What are we going to see in each case.

b) What are we going to see, if the object is 1 meter under water. (repeat for both light sources)

c) What are we going to see, if the object is 10 meters under water. (repeat for both light sources)

d) Discussion; briefly explain the image formation process. Explain your results and if there is any difference, explain the reason.

hint: You may want to use the spectrum of the source and reflection spectrum for each pixel, to find the spectrum of the reflected light that reaches the detector (in this case, human eye). Using that, you can find the perception of the human eye for different colors and reconstruct the image.