

Q3.

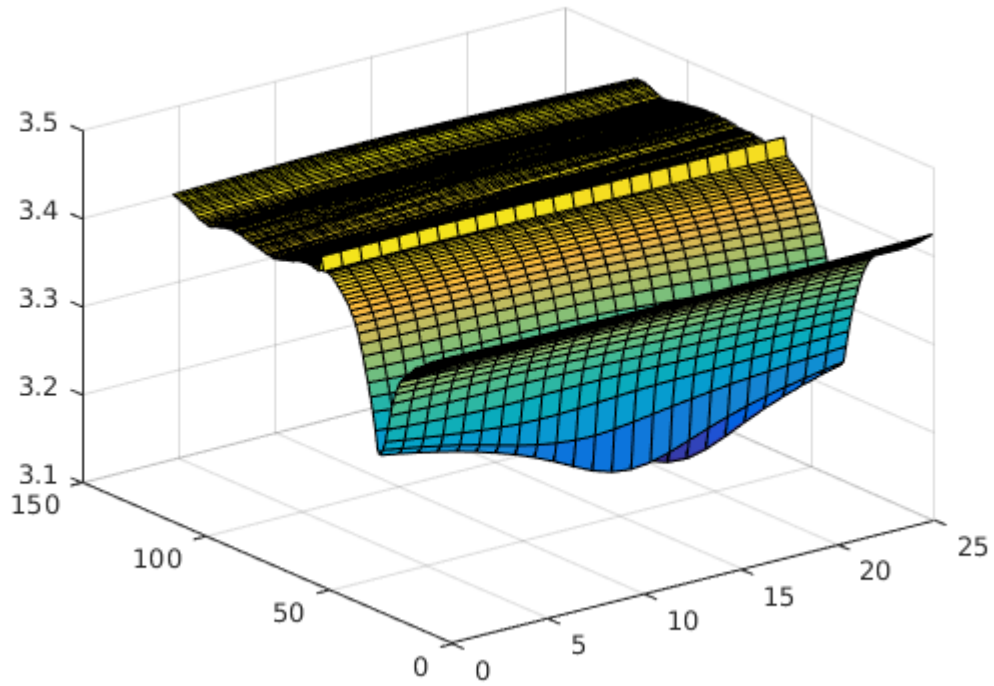
For flash and no-flash images the values obtained are :

minimum = 3.1681

minimum $\theta$  = -23

minimum $t_x$  = 4

The plot of joint entropy as a function of  $\theta$  and  $t_x$  for the above pair:



The plot does not contain a unique global minimum as in case of barbara.

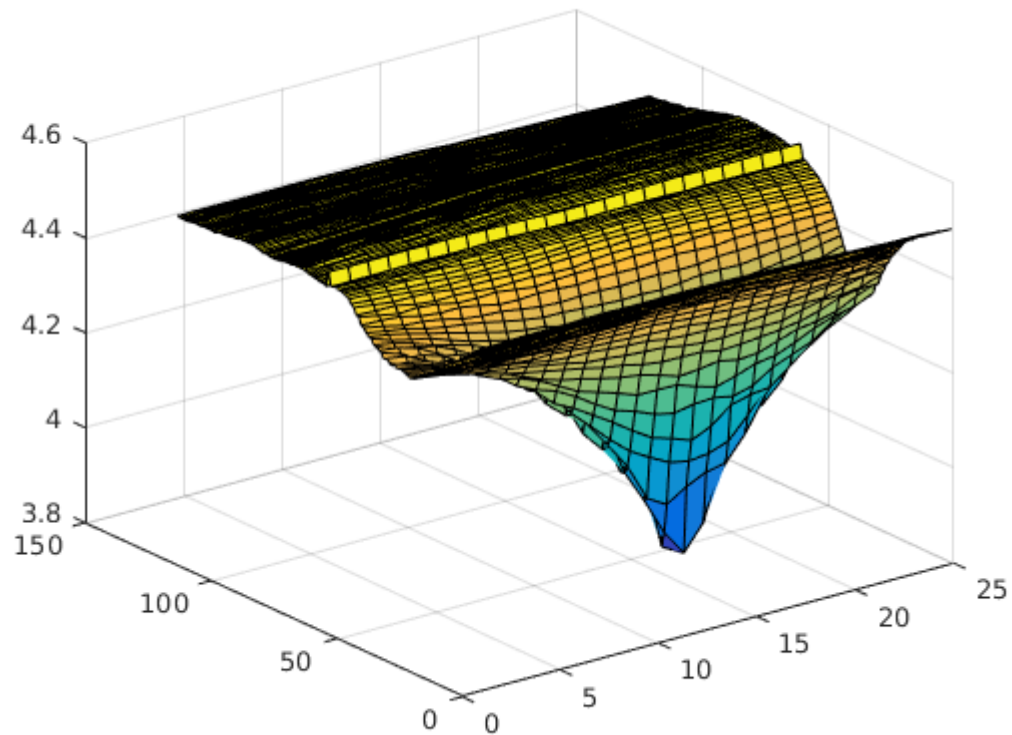
For barbara image and its negative:

minimum = 3.8315

minimumth = -23

minimumtx = 3

The plot of joint entropy as a function of  $\theta$  and  $t_x$  for the above pair of images:



Clearly the values obtained are perfect for the barbara image. As we can see the plot of the barbara image has a very nice global min different from the one with flash image. Hence the minimum  $t_x$  obtained is 4. For 4 and 3 the values are almost the same for flash;

```
size(im) = 256 * 256.
```

findJEvalue finds out the JE value for specified values of ith and tx.

If we put tx = -257 and ith = 23.5 then the images are obviously misaligned

The values come like this :

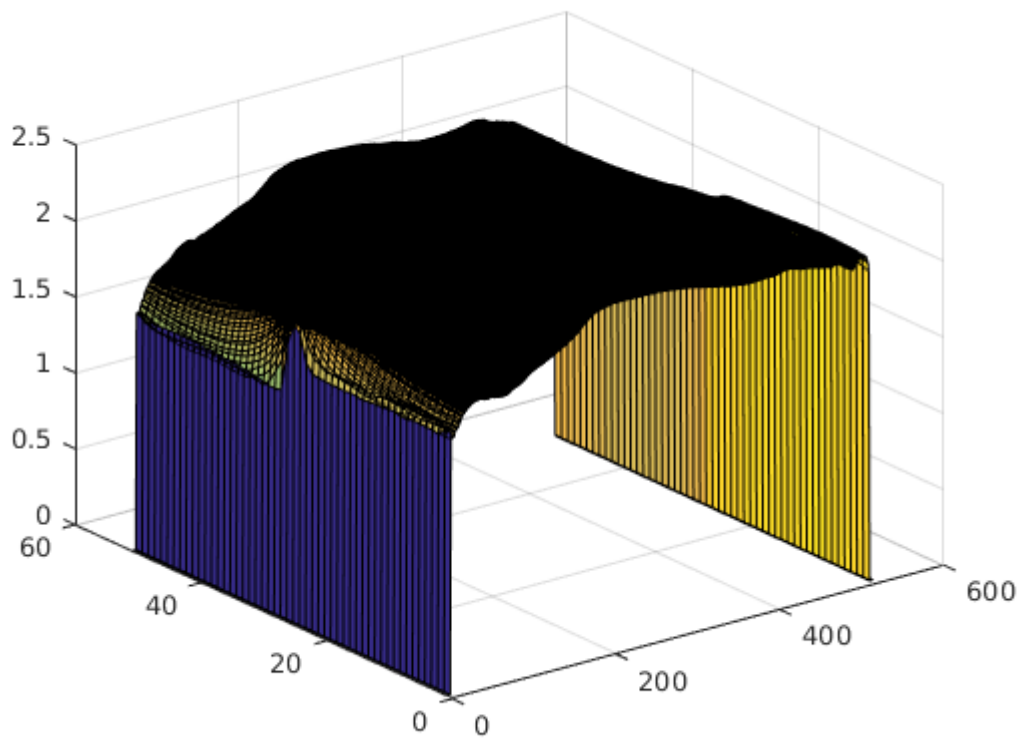
```
minimum = 0
```

```
minimumth = -25
```

```
minimumtx = -260
```

which are not in accordance with the parameters ith and tx (because we are not iterating for the values of tx and ith in that range) given and as we can see the the minimum value obtained is lower than the 'true' minimum.

The jointEntropy plot is obtained like this:



As we can see the algo found out the minvalue in this plot but it is not the required values.