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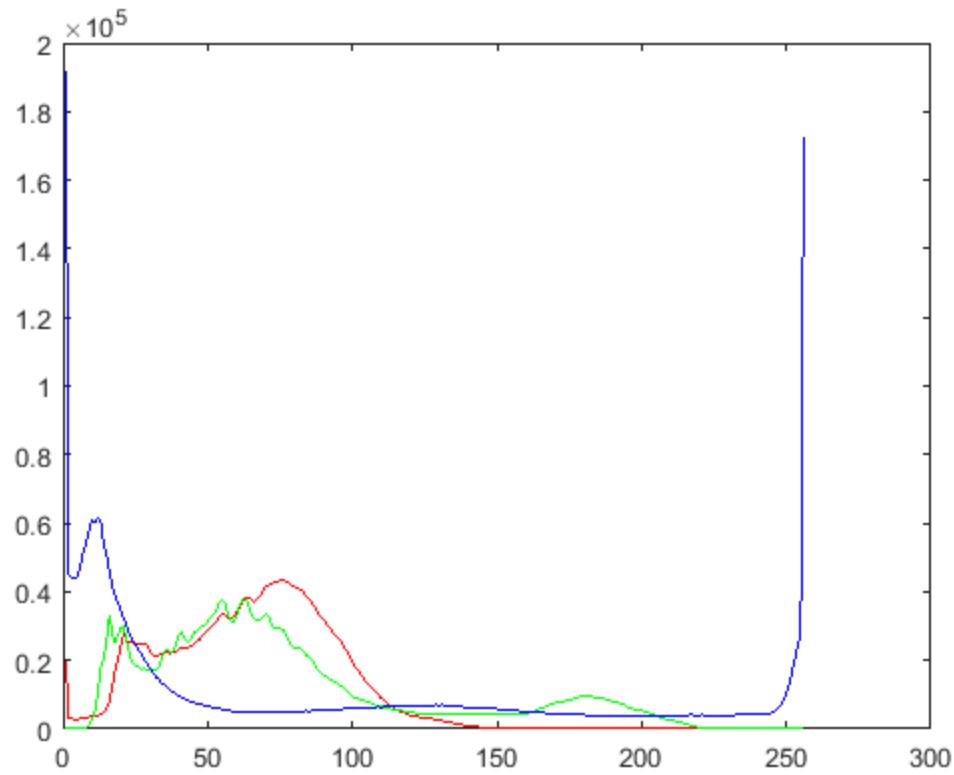
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### 1a)

```
blueten = imread('blueten.jpg');
doubleBild = double(blueten);
doubleBild = doubleBild ./ 255;
```

### 1b)

```
imhist(doubleBild)
title('Histogramm');
% Histogram red
redhist = imhist(doubleBild(:,:,1));
% Histogram green
greenhist = imhist(doubleBild(:,:,2));
% Histogram blue
bluehist = imhist(doubleBild(:,:,3));
plot(redhist, 'r');
hold on
plot(greenhist, 'g');
plot(bluehist, 'b');
```

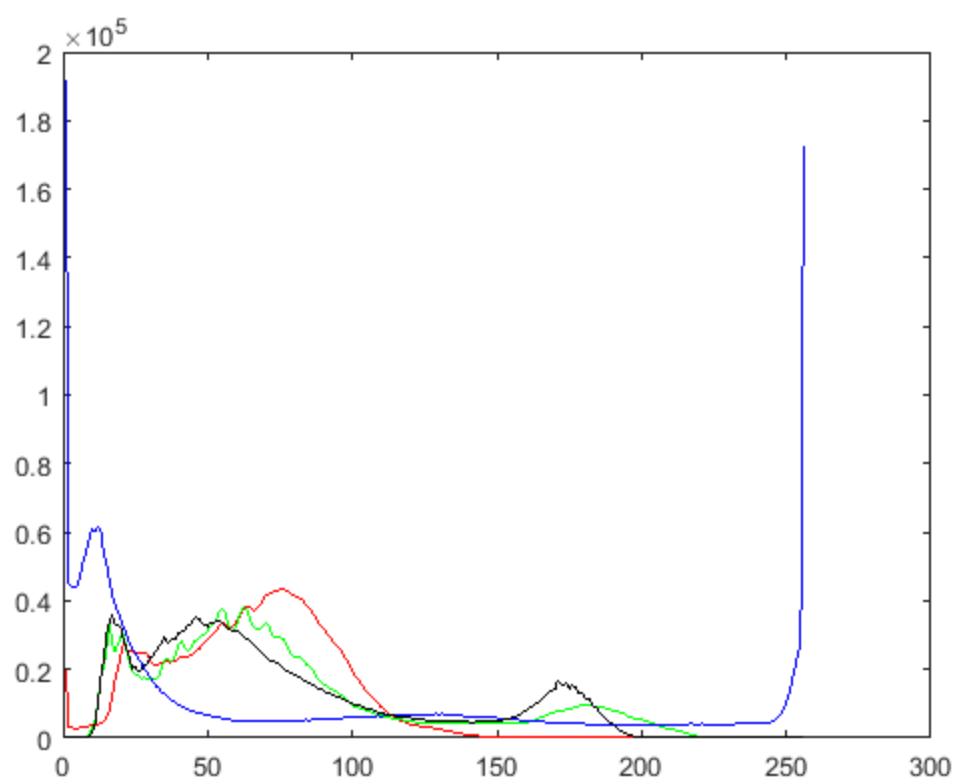


## 1c)

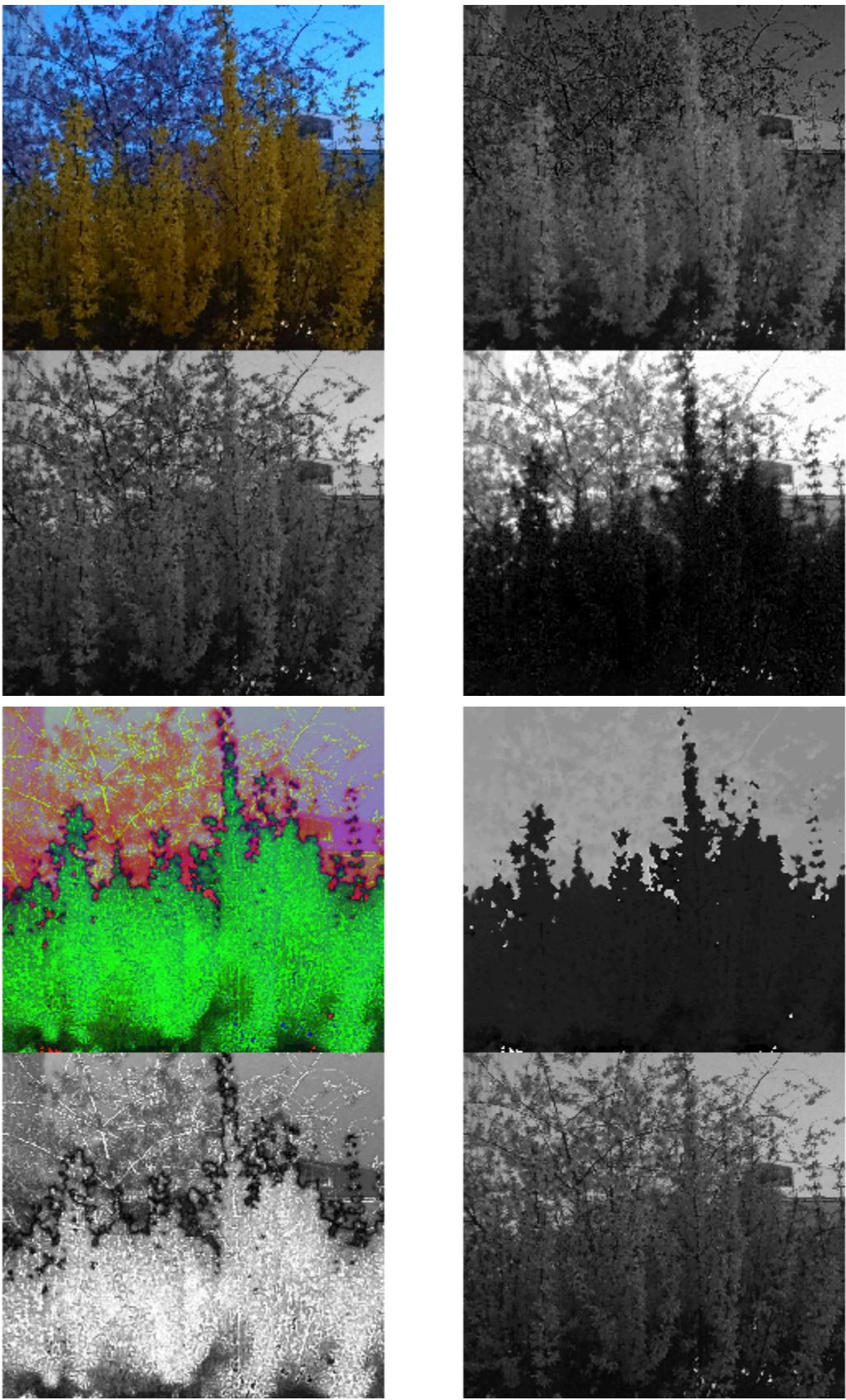
Vermutung: das Bild wird zu dunkel dargestellt, da sehr viele Werte im Histogramm in den dunklen Regionen vorhanden sind.

```
bluetenhs1=rgb2hs1(blueten);
helligkeithist = imhist(bluetenhs1(:,:,3));
plot(helligkeithist, 'black'); figure
imshow(doubleBild);
% Vermutung war richtig
showQuadView(doubleBild, doubleBild(:,:,1), doubleBild(:,:,2),
doubleBild(:,:,3));
showQuadView(bluetenhs1,bluetenhs1(:,:,1),bluetenhs1(:,:,2),bluetenhs1(:,:,3));

Warning: Image is too big to fit on screen; displaying at 50%
```







---

## 1d)

```
minhelligkeit = min(bluetenhs(:, :, 3), [], 'all')
maxhelligkeit = max(bluetenhs(:, :, 3), [], 'all')
kontrast = maxhelligkeit - minhelligkeit
```

*minhelligkeit =*

*0.0170*

*maxhelligkeit =*

*0.9882*

*kontrast =*

*0.9712*

## 1e)

```
stabileKontrastWerte = stretchlim(bluetenhs(:, :, 3))
stabileKontrast = stabileKontrastWerte(2, 1) - stabileKontrastWerte(1, 1)
```

*stabileKontrastWerte =*

*0.0484*

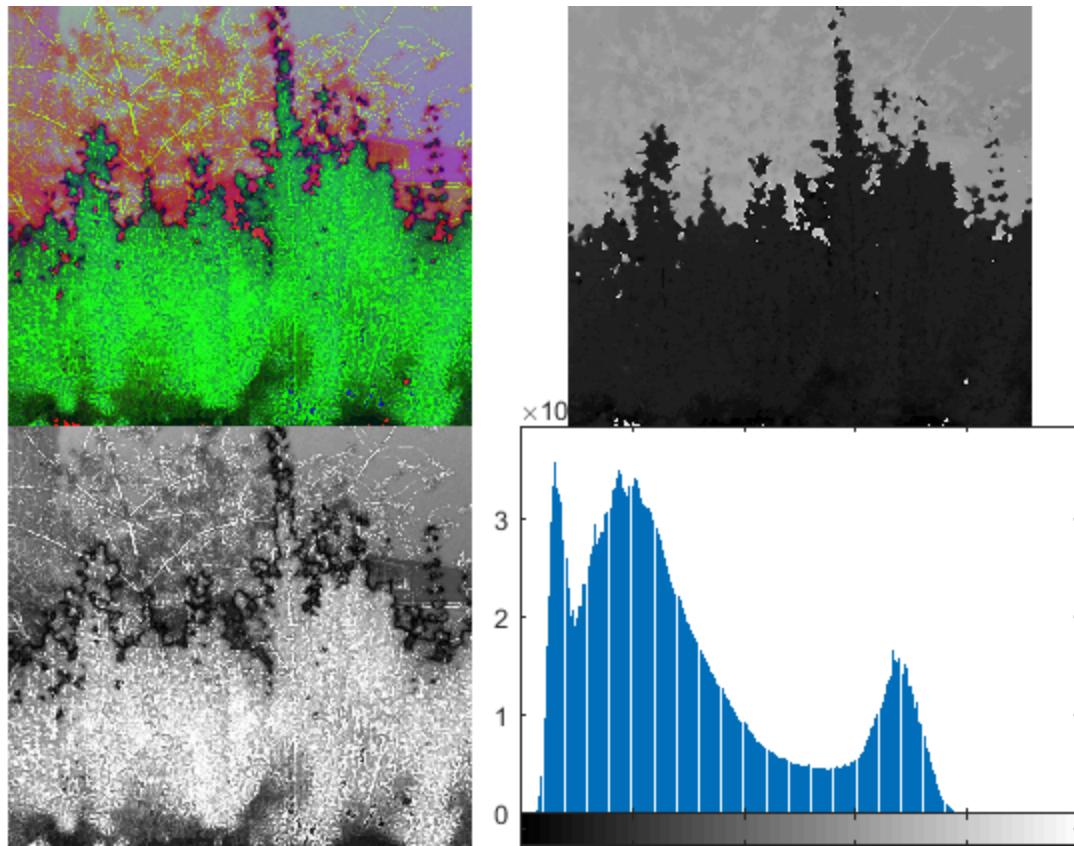
*0.7307*

*stabileKontrast =*

*0.6824*

## 1f)

```
imhist(bluetenhs(:, :, 3))
% Man könnte aus dem Histogram zumindest auf den größeren Unterschied
% zwischen maxIntensität und dem oberen Quantil schließen, da sich die
% Helligkeit oberhalb von 200 über einen größeren Raum auf der Achse
% bewegt.
```



**1g)**

```
P = imhist(bluetenhs1(:,:,3));
% 0 ausschließen und Nomierung
P = P(P>0)./sum(P);
entropie = -sum((P .* log2(P)))
```

*entropie =*

7.2305

**2a)**

```
bluetenhs1_neu = bluetenhs1;
intensity = bluetenhs1(:,:,3);
imshow(intensity); figure
grey = imhist(bluetenhs1(:,:,3));
s = stretchlim(bluetenhs1(:,:,3))
gmax = s(2,1);
gmin = s(1,1);
intensity_spreiz = (intensity - gmin) .* ((1-0)/(gmax-gmin)) + 0;
imshow(intensity_spreiz); figure
% neues RGB-Bild
```

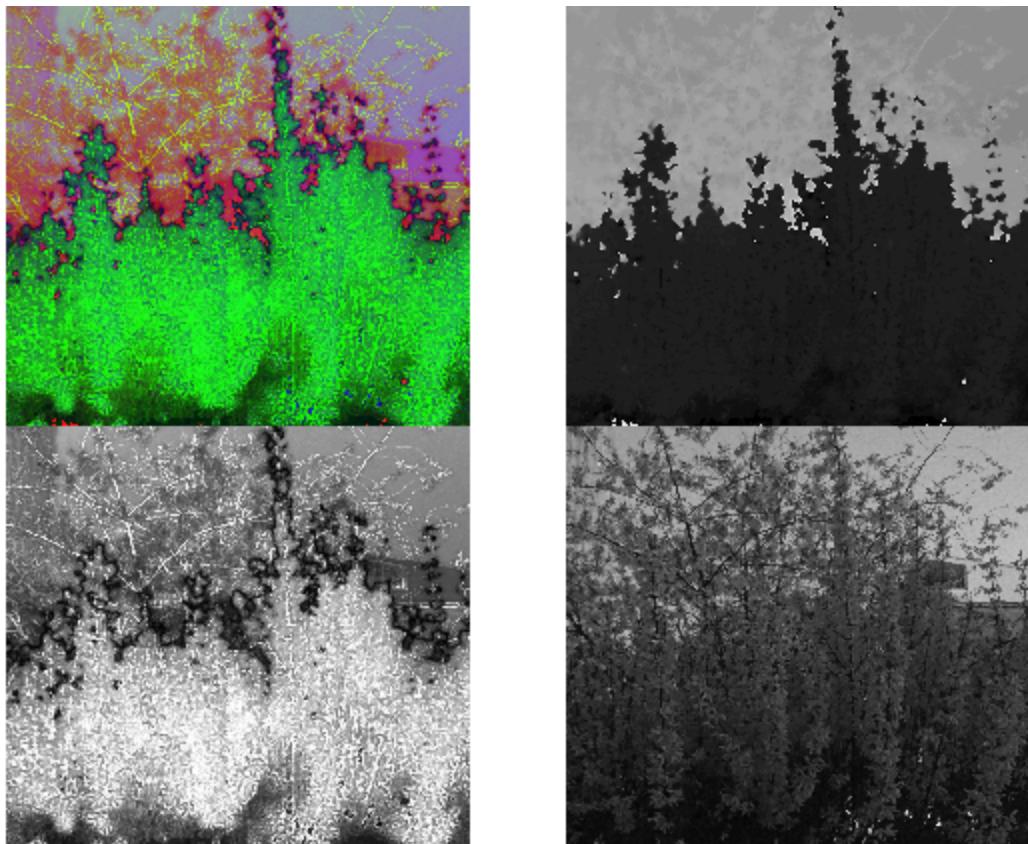
---

```
bluetenhs1_neu(:,:,3) = intensity_spreiz;
bluetenrgb = hsi2rgb(bluetenhs1_neu);
imshow(bluetenrgb); figure
```

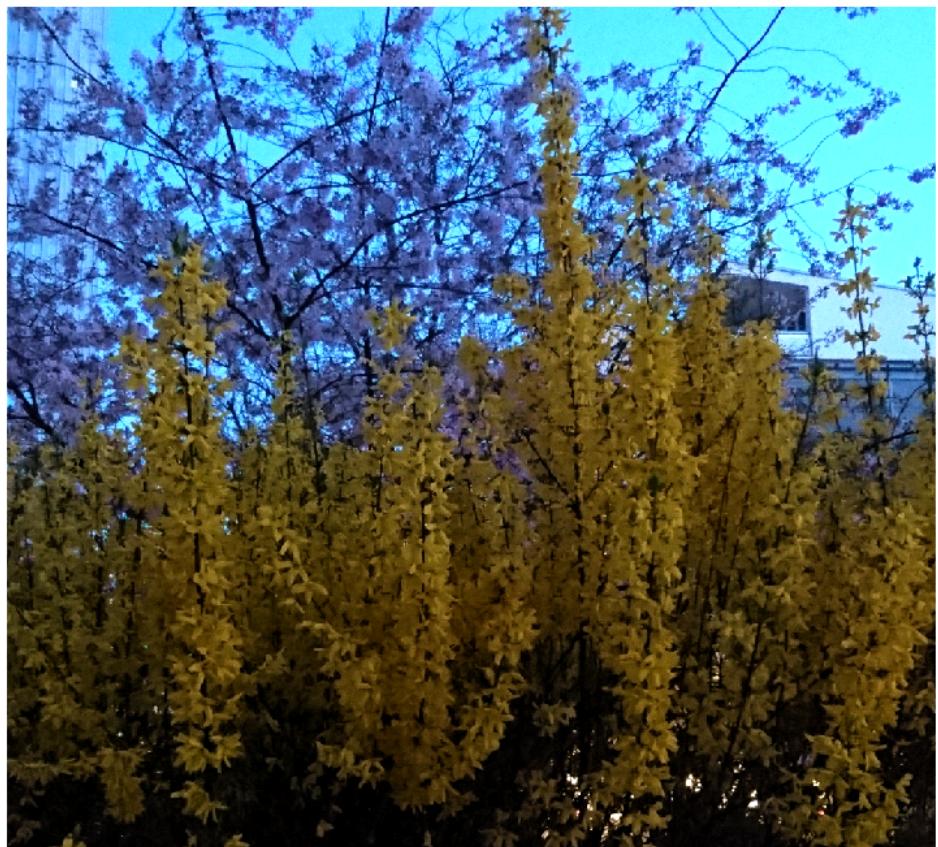
*s* =

0.0484  
0.7307

*Warning: Image is too big to fit on screen; displaying at 50%*  
*Warning: Image is too big to fit on screen; displaying at 50%*







---

## 2b)

```
imshow(intensity);figure  
gamma = 0.5;  
intensity_gamma = 1.0 .* (intensity/1.0).^gamma;  
imshow(intensity_gamma); figure  
% neues RGB-Bild  
bluetenhs1_neu(:,:,3) = intensity_gamma;  
bluetenrgb = hsi2rgb(bluetenhs1_neu);  
imshow(bluetenrgb); figure  
  
Warning: Image is too big to fit on screen; displaying at 50%  
Warning: Image is too big to fit on screen; displaying at 50%  
Warning: Image is too big to fit on screen; displaying at 50%
```







---

## 2c)

```
intensity_histeq=histeq(intensity);
imshow(intensity_histeq);figure
intensity_lin= adapthisteq(intensity);
imshow(intensity_lin);figure
imshow(intensity); figure
% neues RGB-Bild
bluetenhs1_neu(:,:,3) = intensity_lin;
bluetenrgb = hsi2rgb(bluetenhs1_neu);
imshow(bluetenrgb); figure
% neues RGB-Bild
bluetenhs1_neu(:,:,3) = intensity_histeq;
bluetenrgb = hsi2rgb(bluetenhs1_neu);
imshow(bluetenrgb); figure

Warning: Image is too big to fit on screen; displaying at 50%
Warning: Image is too big to fit on screen; displaying at 50%
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Warning: Image is too big to fit on screen; displaying at 50%
```











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## 2c) Optional: mit AquaTermi\_lowcontrast

```
aquatermi = imread('AquaTermi_lowcontrast.jpg');
aquatermi_hsi=rgb2hsiaquatermi);
aquatermi_i = aquatermi_hsi(:,:,3);
imshow(aquatermi_i);figure
equalization_aqua=histeq(aquatermi_i);
imshow(equalization_aqua);figure
aquatermi_i_neu= adapthisteq(aquatermi_i);
imshow(aquatermi_i_neu);figure

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Warning: Image is too big to fit on screen; displaying at 33%
Warning: Image is too big to fit on screen; displaying at 33%
```







---

## 2d)

Entropie nach der Gamma-Korrektur

```
entropy_gamma = entropy(intensity_gamma)
% Entropie nach der Histogrammlinearisierung
entropy_histeq = entropy(intensity_histeq)
entropy_lin = entropy(intensity_lin)
```

```
entropy_gamma =
```

```
7.2587
```

```
entropy_histeq =
```

```
5.9547
```

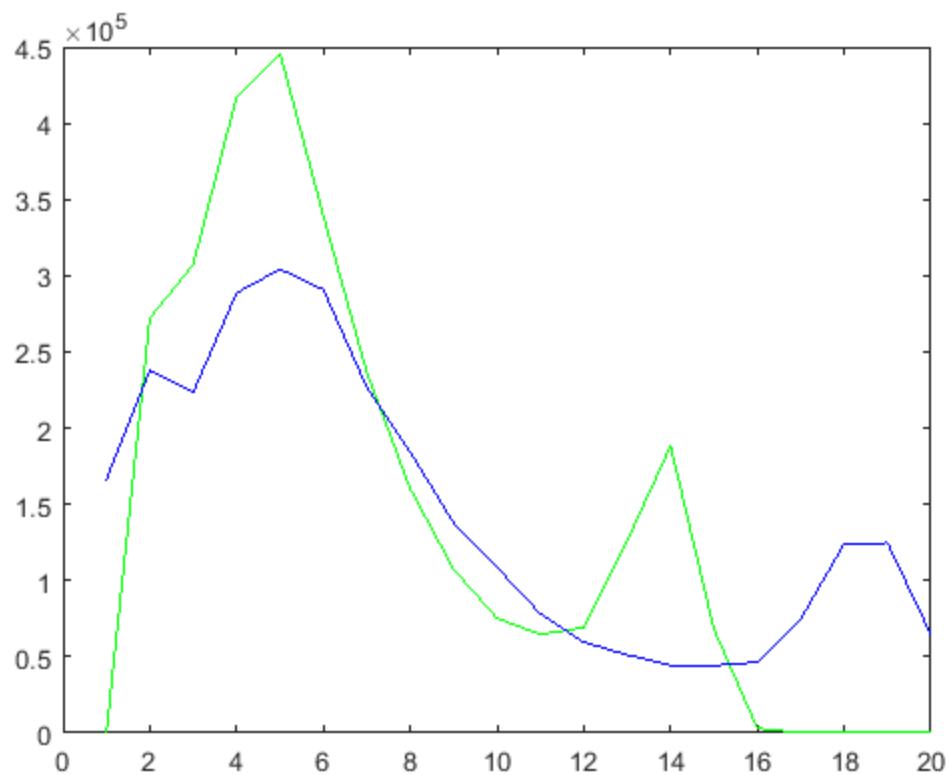
```
entropy_lin =
```

```
7.8743
```

## 2e)

Histogram nach der Histogrammspreizung

```
hist_before = imhist(intensity,20);
hist_spreiz = imhist(intensity_spreiz,20);
plot(hist_before, 'green');
hold on
plot(hist_spreiz, 'blue');
```



Published with MATLAB® R2018b