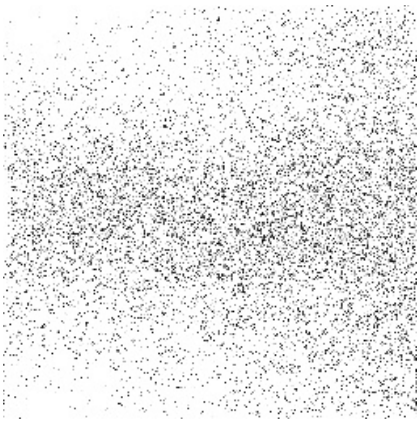
1. AŞAĞIDAKI IŞLEMLERI YAPAN MATLAB / PYTHON /OPENCV KODLARINI YAZINIZ.

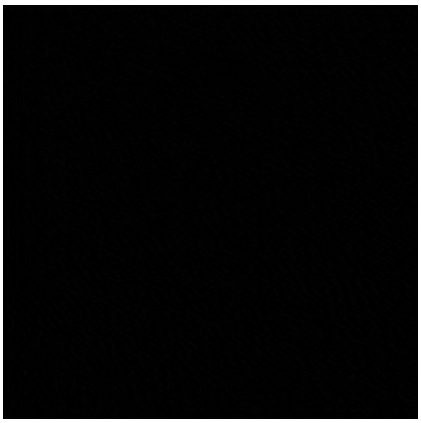
A-) IMG.JPG GÖRÜNTÜ DOSYASINI OKUYUNUZ, 2 BOYUTLU FOURIER DÖNÜŞÜMÜ UYGULAYARAK FAZ BILGISINI FAZ.MAT, GENLIK BILGISINI GENLIK.MAT ISIMLI DOSYALARA YAZDIRINIZ.

B-) FAZ VE GENLIK MATRISLERINI AYRI AYRI FAZ.JPEG VE GENLIK.JPEG ISIMLI DOSYALARA GÖRÜNTÜ OLARAK YAZDIRINIZ.

img.jpg



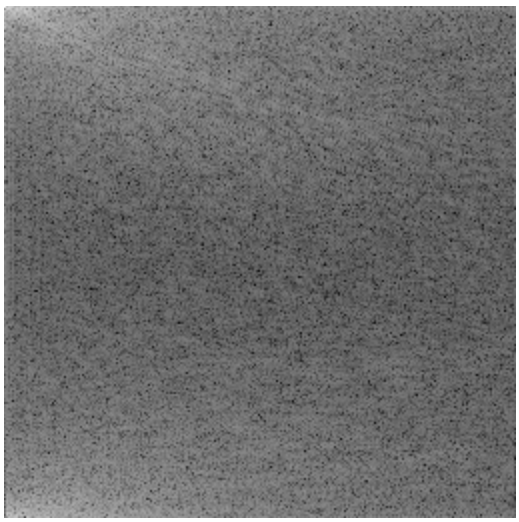
genlik.jpg



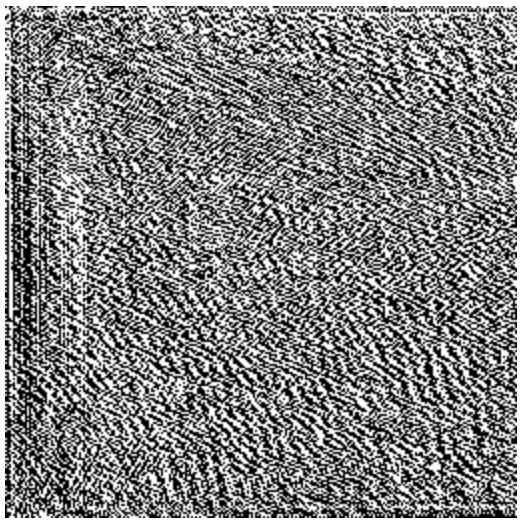
faz.jpg

Switch to a logarithmic scale. It turns out that the dynamic range of the Fourier coefficients is too large to be displayed on the screen. We have some small and some high changing values that we can't observe like this. Therefore the high values will all turn out as white points, while the small ones as black. To use the gray scale values to for visualization we can transform our linear scale to a logarithmic one:

$$M_1 = \log(1 + M)$$



genlik_LogScale.jpg



faz_LogScale.jpg

C-) FAZ VE GENLIK BILGISINI KULLANARAK TERS FOURIER DÖNÜŞÜMÜ ILE GÖRÜNTÜYÜ YENIDEN ELDE EDINIZ.

D-) C'DE ELDE ETTIĞINIZ GÖRÜNTÜ ILE ORIJINAL GÖRÜNTÜNÜN FARKINI ALIP FARK GÖRÜNTÜSÜNÜ FARK.JPEG DOSYASINA YAZDIRINIZ.

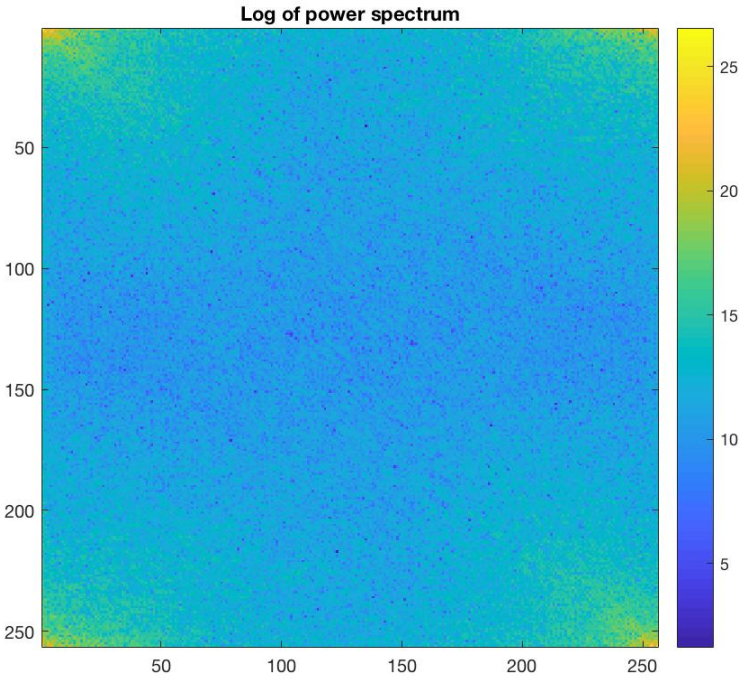
img.jpg

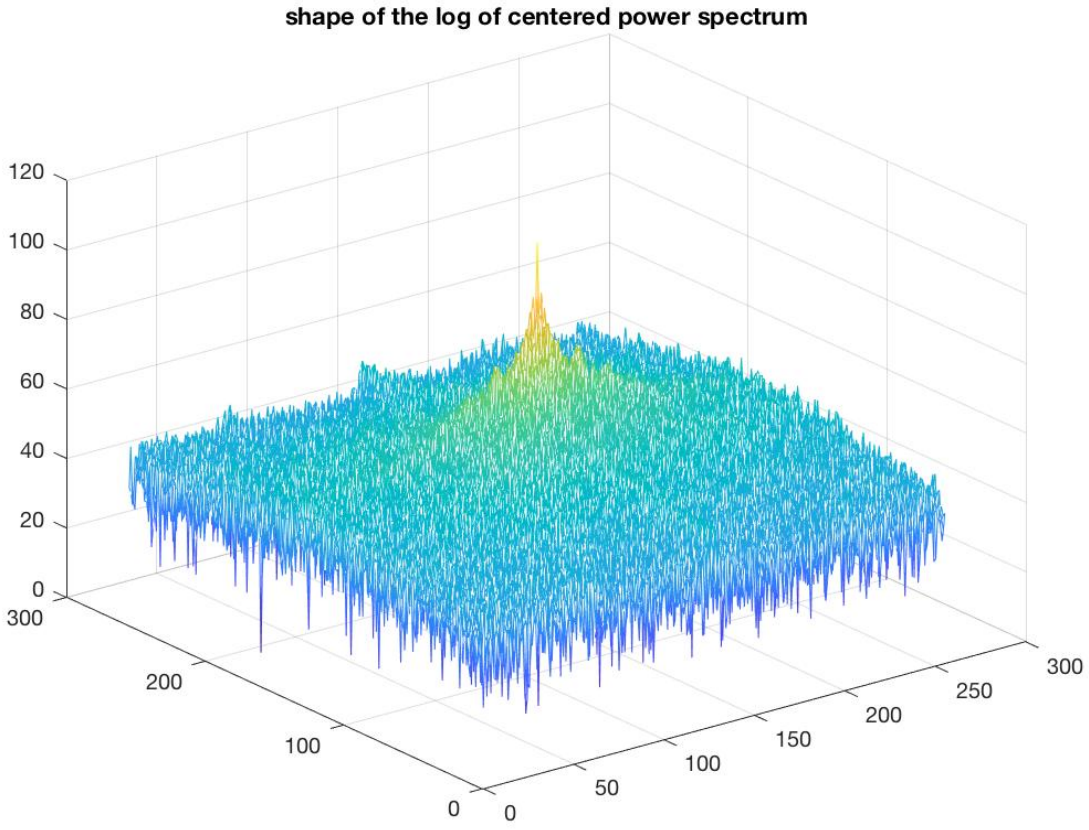
InverseTransform.jpg

fark.jpg

There are some points that are different from "img.jpg"

E-) GÜÇ SPEKTRUMUNU HESAPLATARAK POWER.MAT ISIMLI DOSYAYA KAYDEDINIZ.





F-) PARSEVAL TEOREMINI KULLANARAK GÖRÜNTÜNÜN ORTALAMA GÜCÜNÜ HESAPLATINIZ.

For “fark.jpg” image file,
Mean Power on frequency domain(Matlab) :127.1606
Mean Power on time domain(C++) : 127.084

total energy of waveform X(t) (1D,2D and 3D) computed in time domain is equal to the total energy of the waveform's Fourier Transform

F(X(t))=x(f) computed in the frequency domain

$$\frac{\sum |Image(row, col)|^2}{rows * cols}$$

Parseval's theorem [1] usually refers to the result that the Fourier transform is unitary; loosely, that the sum (or integral) of the square of a function is equal to the sum (or integral) of the square of its transform.

[1] Parseval des Chênes, Marc-Antoine Mémoire sur les séries et sur l'intégration complète d'une équation aux différences partielles linéaire du second ordre, à coefficients constants" presented before the Académie des Sciences (Paris) on 5 April 1799. This article was published in Mémoires présentés à l’Institut des Sciences, Lettres et Arts, par divers savants, et lus dans ses assemblées. Sciences, mathématiques et physiques. (Savants étrangers.), vol. 1, pages 638–648 (1806).