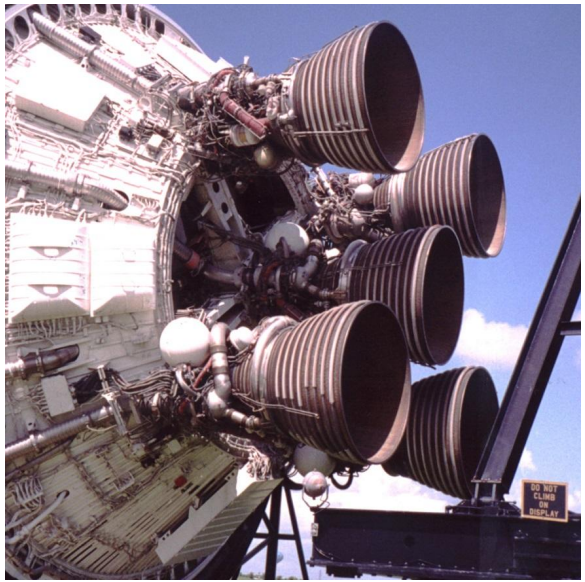
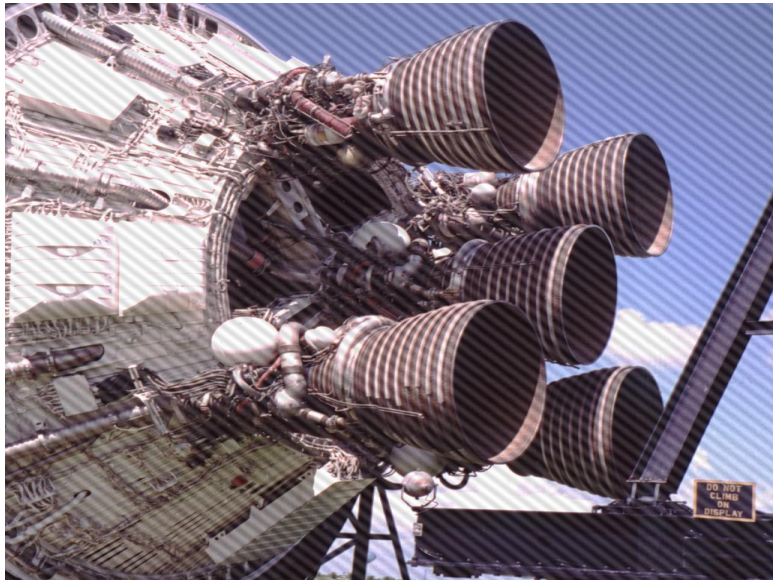
# Gürültü Temizleme-3

# Gürültü tipleri: Periyodik

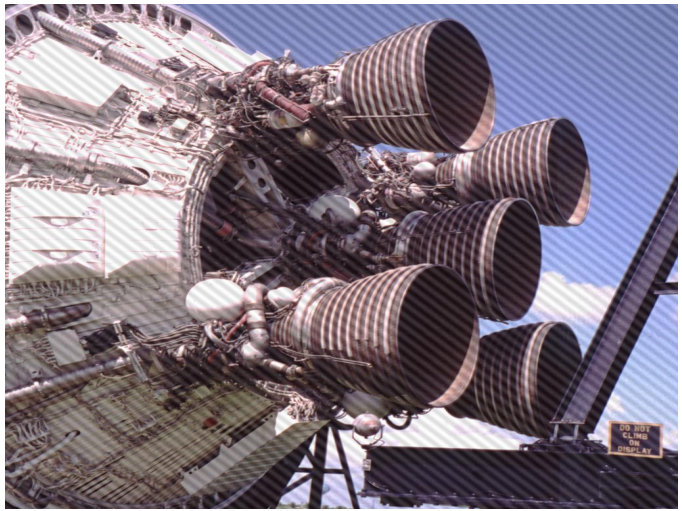



orijinal görüntü




görüntü + gürültü

# Yönsel bulanıklaştırmayla gürültü temizleme



görüntü + gürültü

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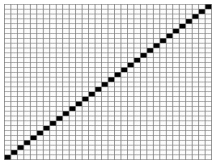

Diyagonal konvolüsyon maskesi

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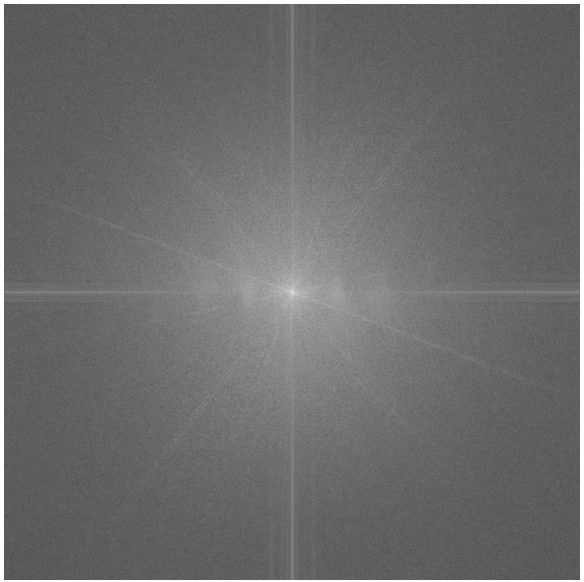
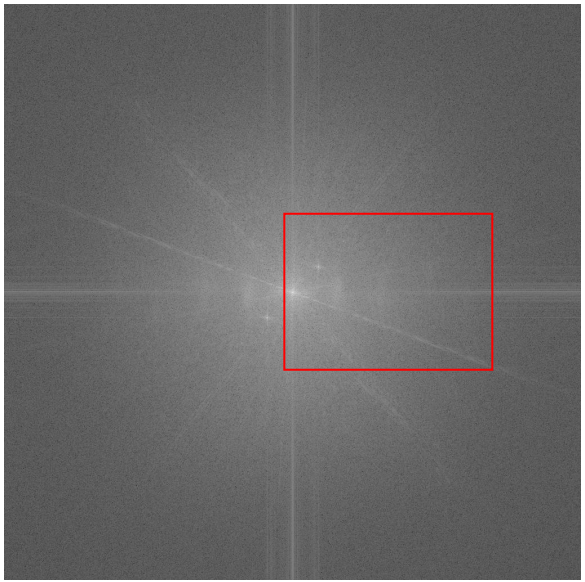
bulanık görüntü

# Periyodik gürültülü görüntünün güç spektrumu

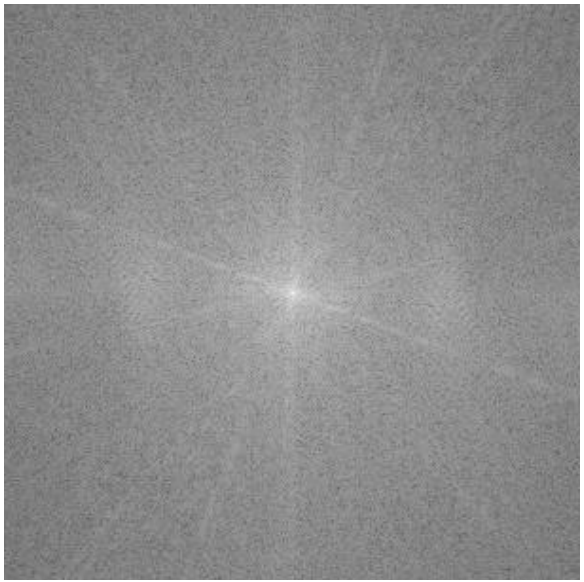


orijinal görüntü

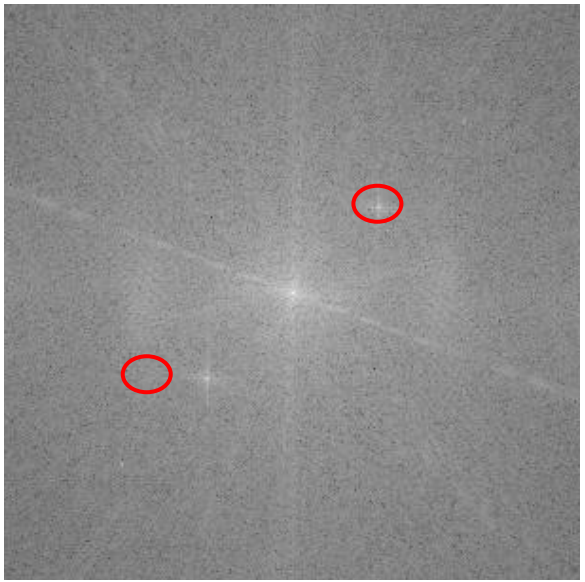


görüntü + gürültü

# Düşük frekanslı alan

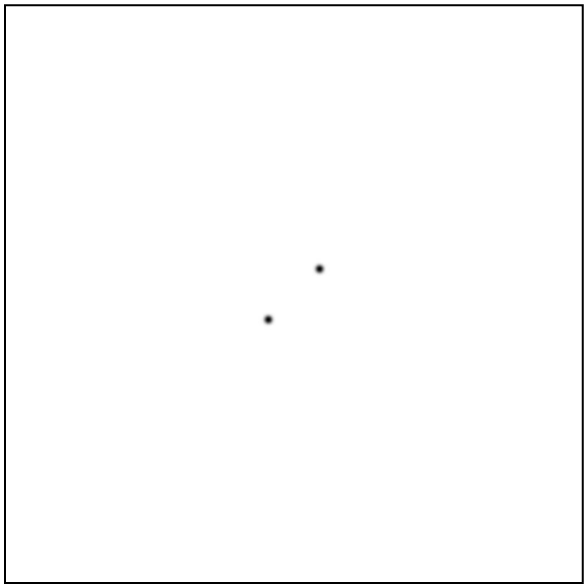


orijinal görüntü

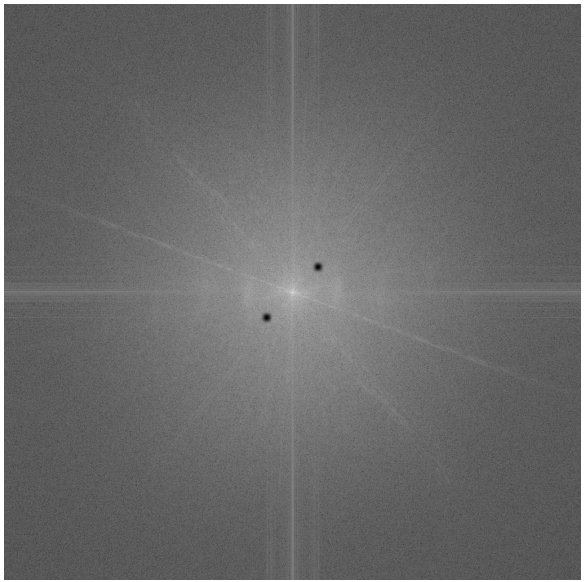


görüntü + gürültü

# Frekans maskeleme ile gürültü temizleme

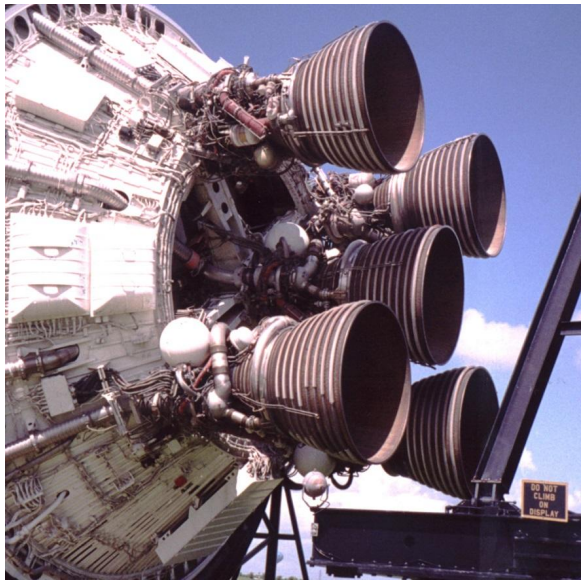


Gürültü maskesi



Maskelenmiş güç spektrumu

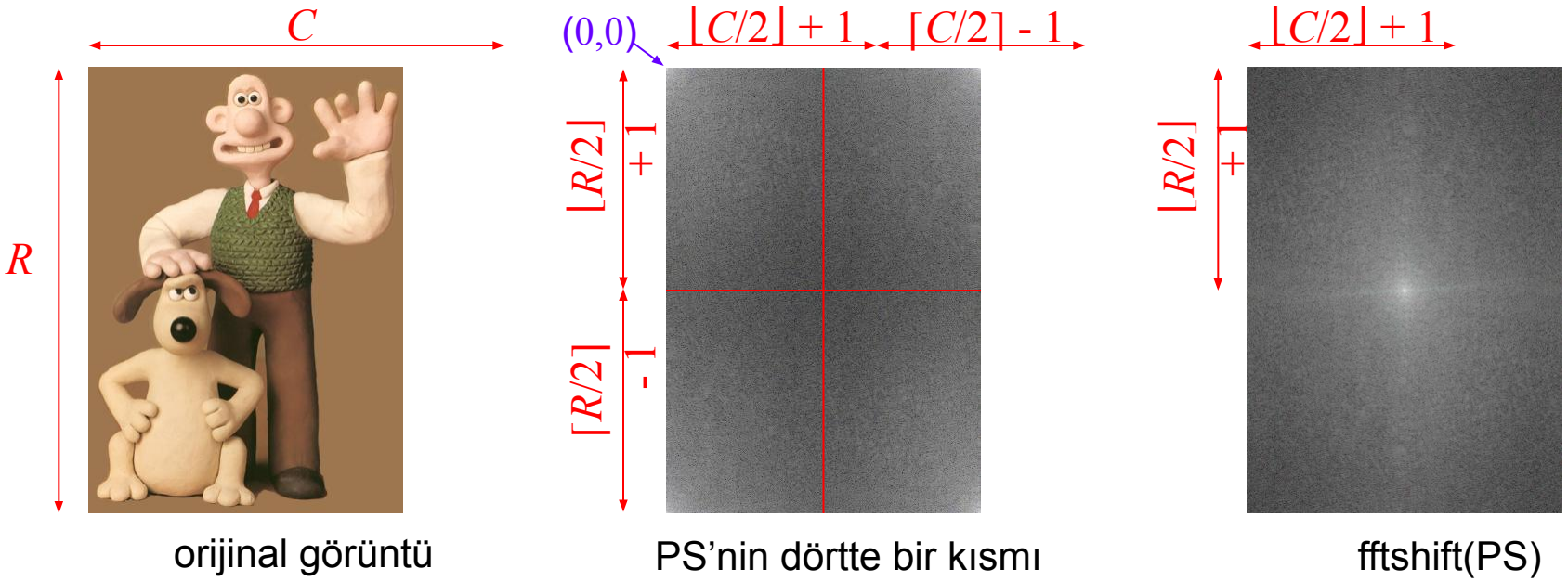
# Maskelenmiş Fourier'in tersi




orijinal görüntü


temizlenmiş görüntü

# Bir görüntünün güç spektrumundaki bir noktanın frekans ve periyodunu nasıl belirlerim?




orijinal görüntü

PS'nin dörtte bir kısmı

fftshift(PS)

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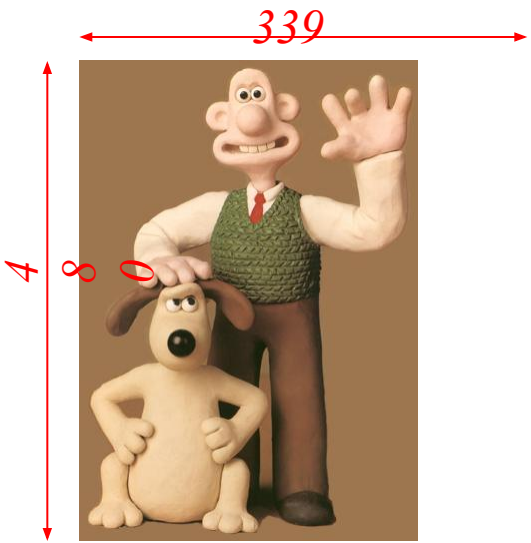
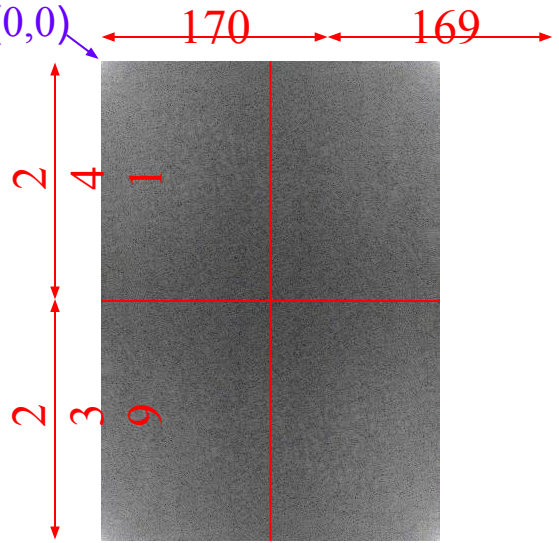
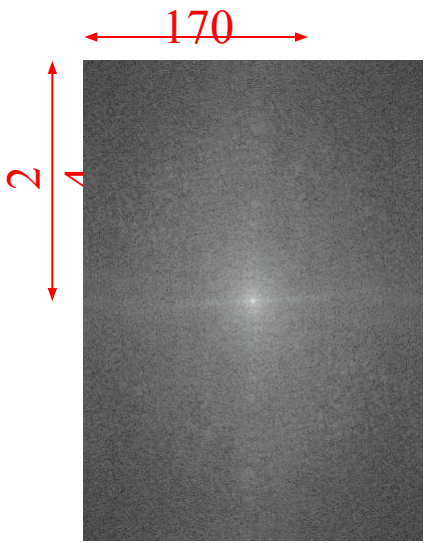



orijinal görüntü




PS'nin dörtte bir kısmı




fftshift(PS)

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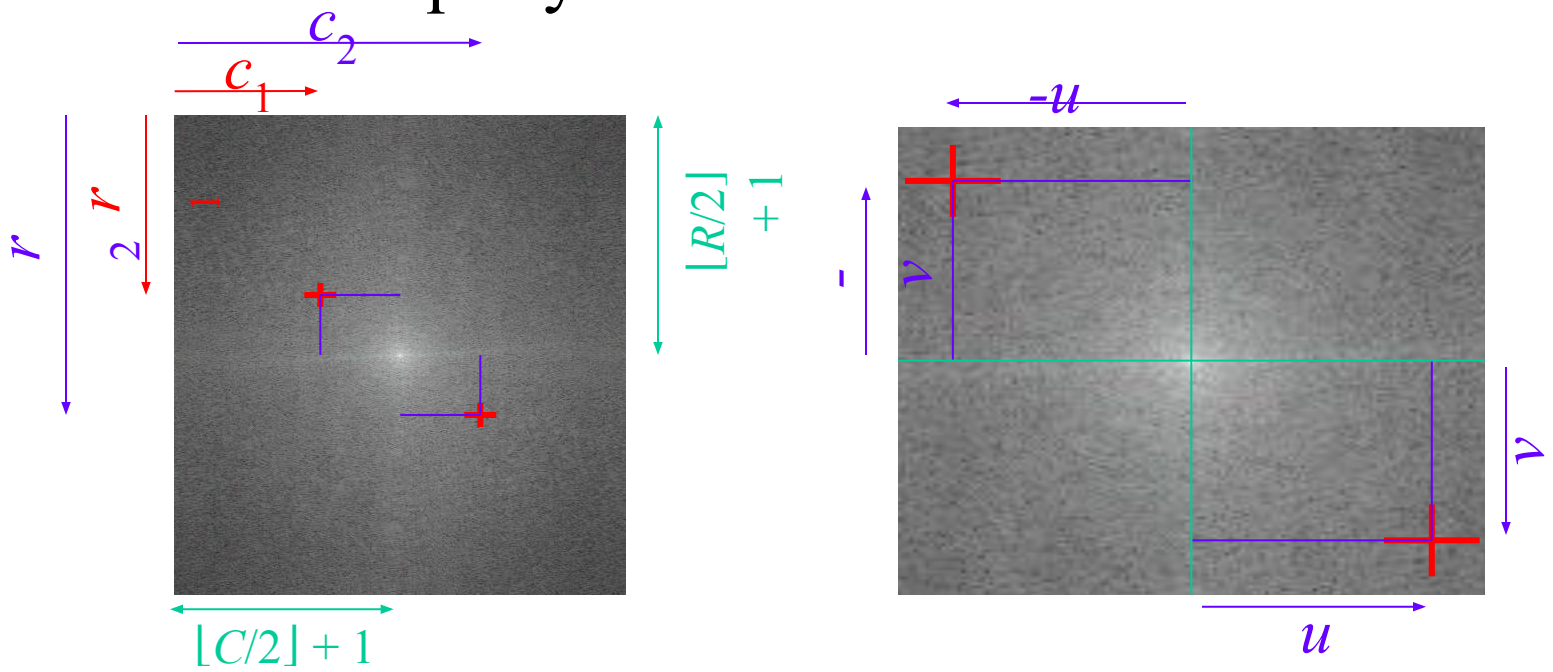

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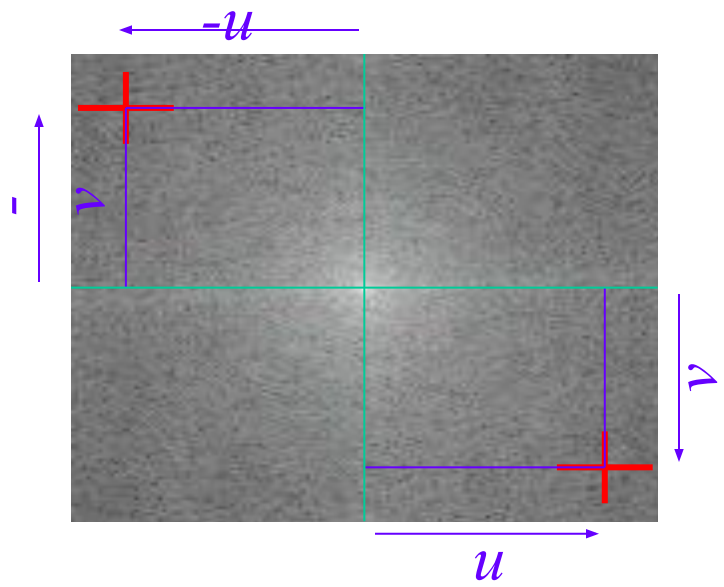



$$v = r_2 - \lfloor R/2 \rfloor - 1$$
$$-v = \lfloor R/2 \rfloor + 1 - r_1$$
$$u = c_2 - \lfloor C/2 \rfloor - 1$$
$$-u = \lfloor C/2 \rfloor + 1 - c_1$$

$$\lambda_{wf} = \sqrt{\left(\frac{C}{u}\right)^2 + \left(\frac{R}{v}\right)^2}$$
$$\omega_{wf} = \frac{1}{\lambda_{wf}}$$
$$\theta_{wf} = \tan^{-1}\left(\frac{vC}{uR}\right)$$

# Fourier Düzlemindeki Noktalar (Görüntünün)

$R \times C$ boyutlu bir sayısal imgenin Fourier dönüşümünde, dalga boyları $\lambda_u$ ve $\lambda_v$, R ve C değerlerinin bir oranını sunar. Yani

$$\lambda_u = \frac{C}{u} \quad \text{ve} \quad \lambda_v = \frac{R}{v} \quad \text{piksel}.$$

Dalga yönü

$$\theta_{wf} = \tan^{-1}\left(\frac{vC}{uR}\right),$$

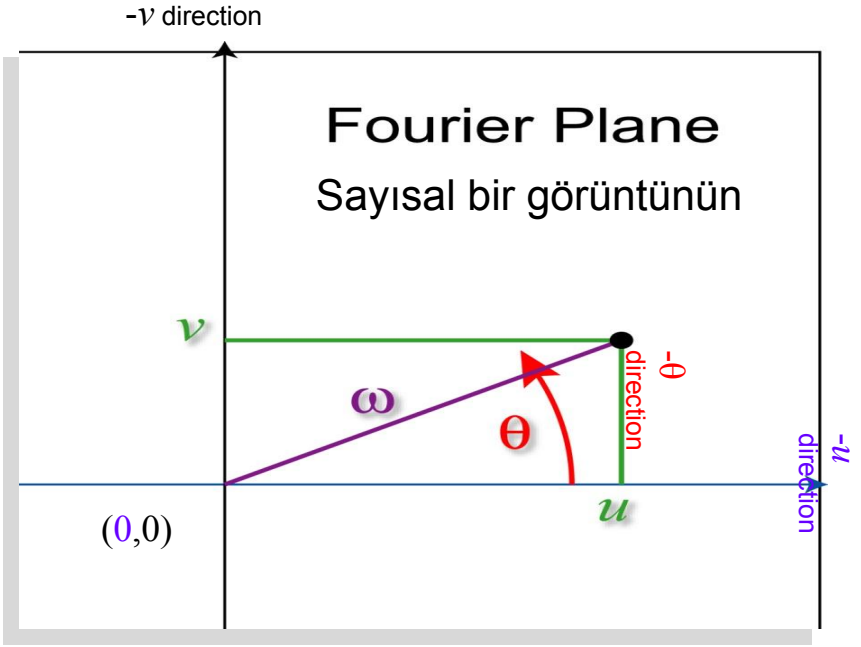
ve boyu

$$\lambda_{wf} = \sqrt{\left(\frac{C}{u}\right)^2 + \left(\frac{R}{v}\right)^2}.$$

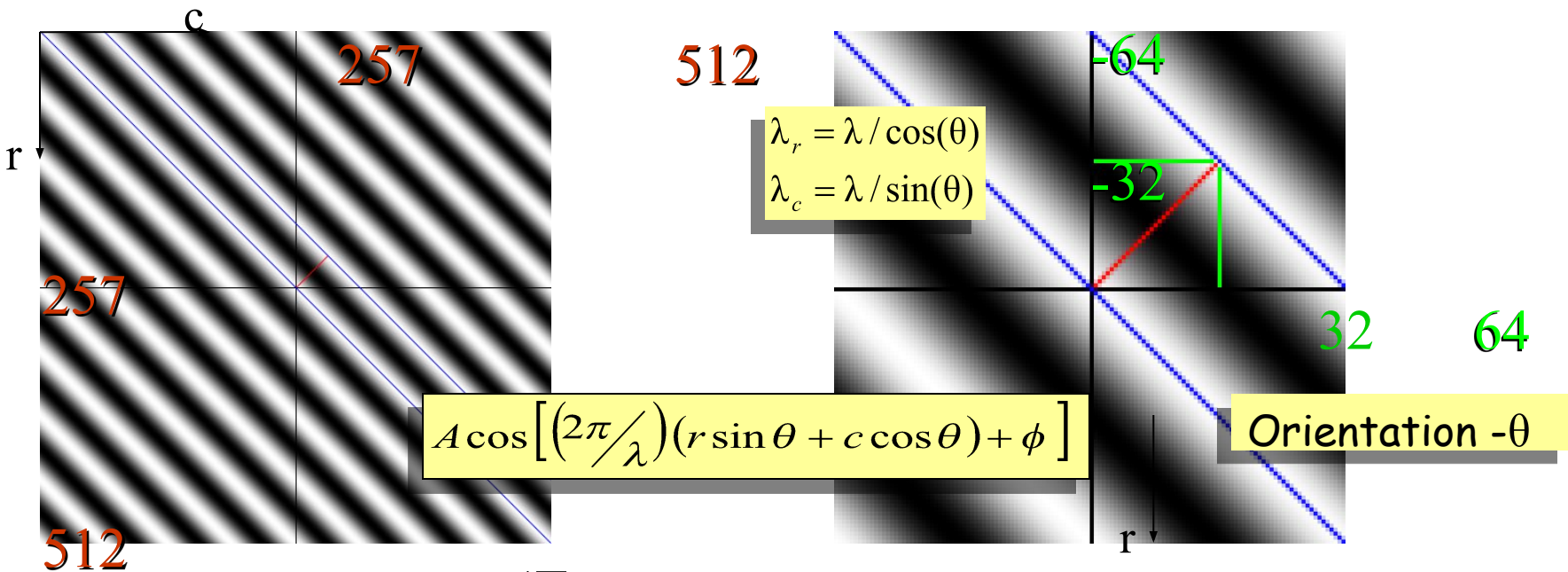
Frekanslar $R$ & $C$'nin oranlarını sunar.

$$\omega_u = \frac{u}{C}, \quad \omega_v = \frac{v}{R}, \quad \text{ve}$$

$$\omega_{wf} = 1 \Big/ \sqrt{\left(\frac{C}{u}\right)^2 + \left(\frac{R}{v}\right)^2} \quad \text{döngüler}$$

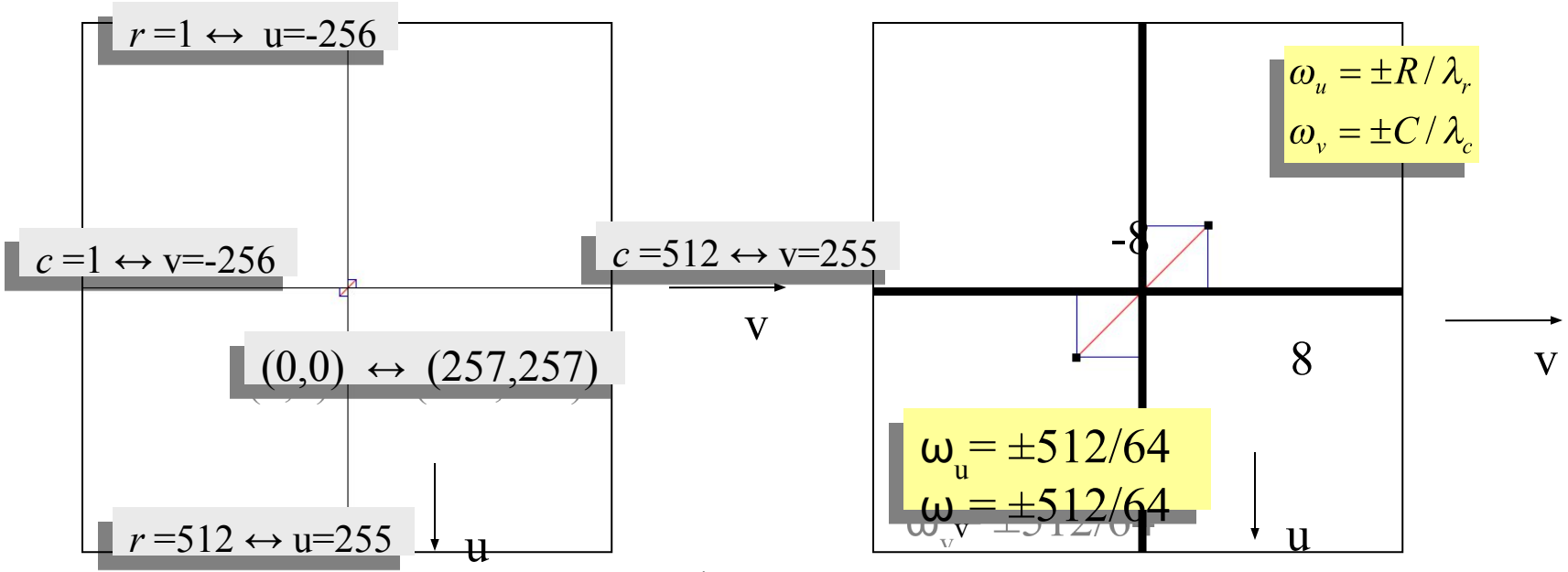


# Bir sinüzoidin frekans düzlemi yerini nasıl belirleriz?



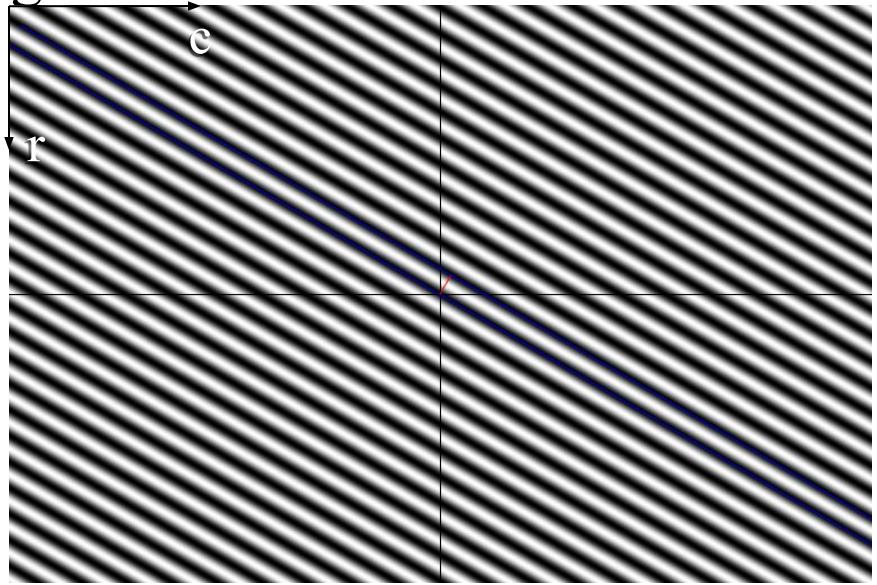

cosine ızgara $\lambda = 32\sqrt{2}$, $\theta = -\pi/4 \Rightarrow \lambda_r = 64 = 512/v$, $\lambda_c = 64 = 512/v$

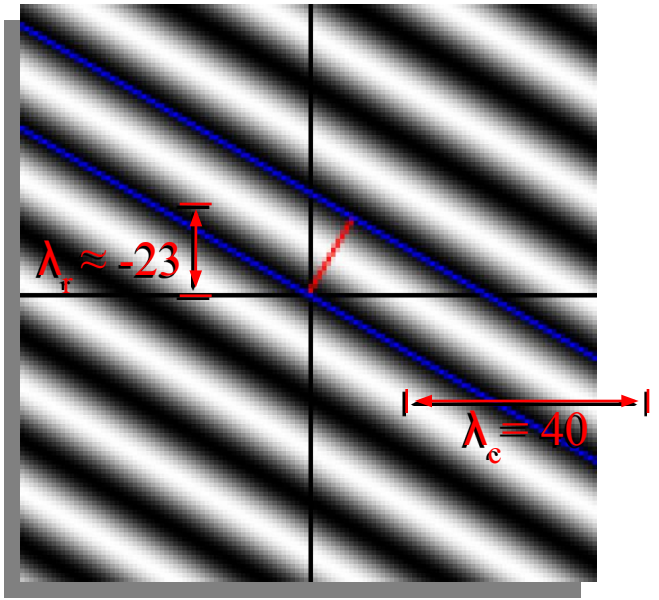
# How to determine the frequency plane location of a sinusoid:




cosine ızgara $\omega = 8\sqrt{2}$, açı = $3\pi/4 \Rightarrow \omega_u = \pm 8, \omega_v = \pm 8$

Tek sayılı sütun ve çift sayılı satırlı bir sinüzoidli bir ızgara görüntüsü



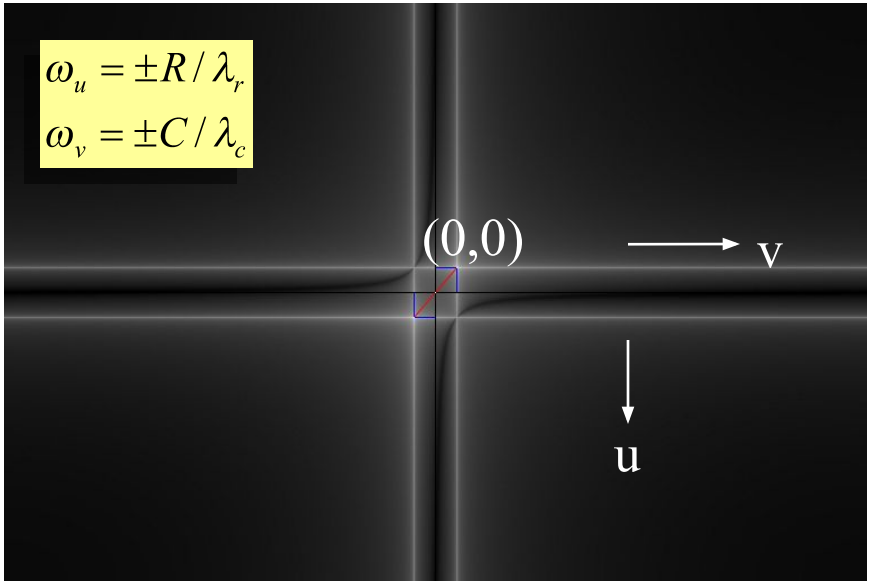

512×767 sine ızgara

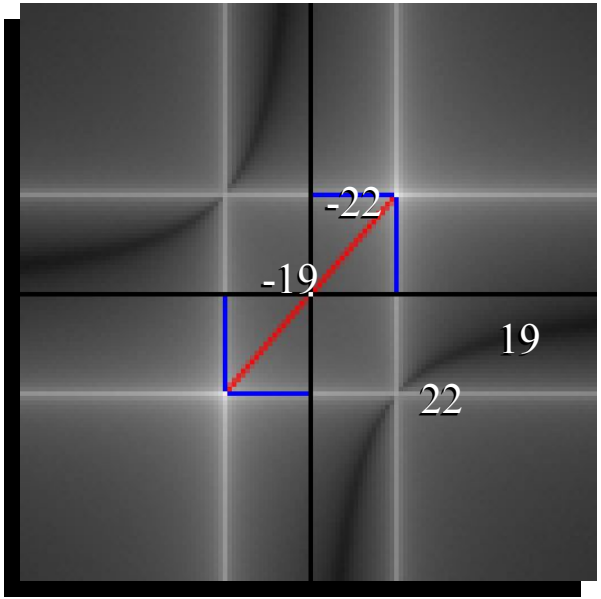
$\lambda = 20$, açı. $= 5\pi/6$

$\Rightarrow \lambda_r = 20/\cos(5\pi/6) \approx -23$ ,

$\lambda_c = 20/\sin(5\pi/6) = 40$

# Sinüs ızgaranın FT




752×937 sine ızgara
λ = 20, açı. = 5π/6
⇒ $\omega_u = \pm 512/\lambda_r \approx \pm 22$ ,
$\omega_v = \pm 767/\lambda_c \approx \pm 19$