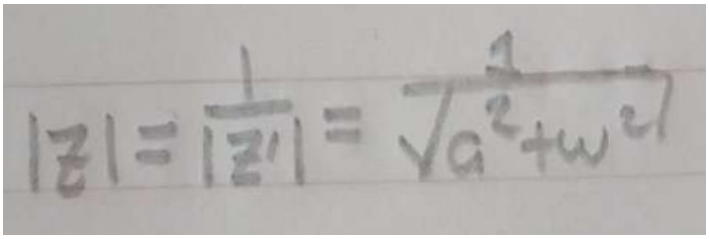
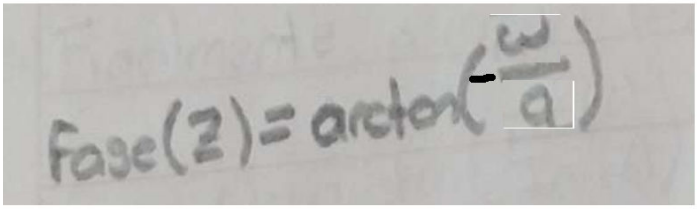
Transformada de fourier

Ploteo del ejercicio a mano

```
syms omega
```





Propiedad de Adrian

```
a=2;
x_mag=1/(a^2+omega^2)
```

```
x_mag =
```

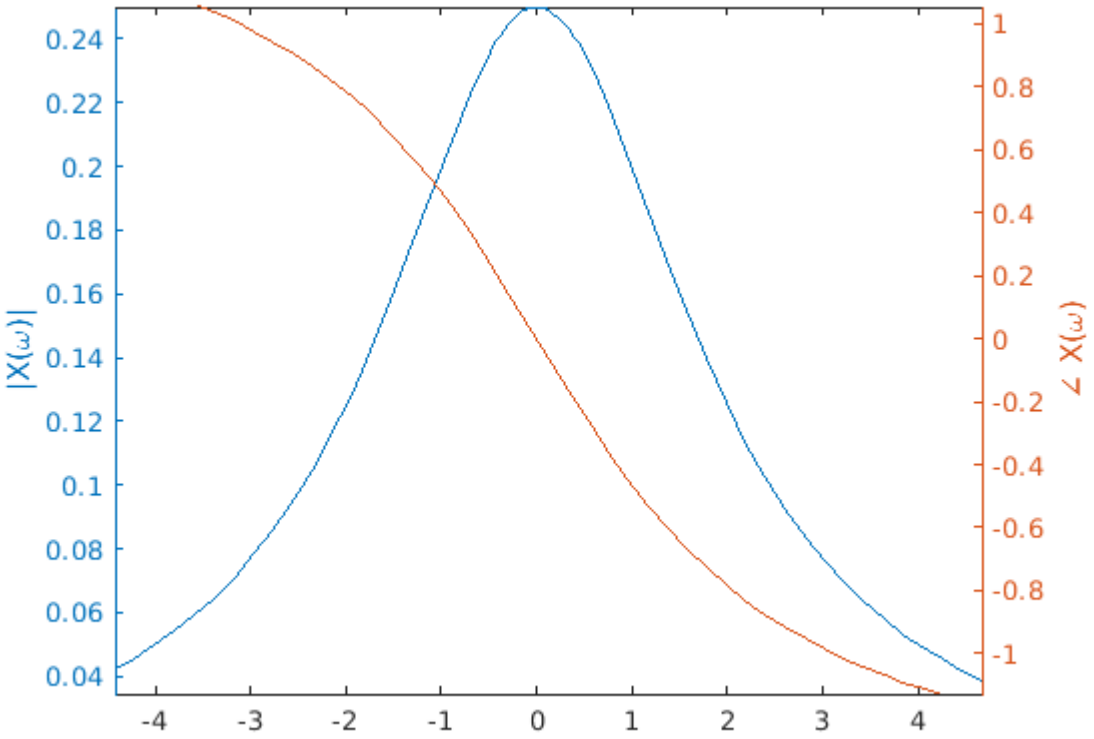
$$\frac{1}{\omega^2+4}$$

```
x_ph=atan(-omega/a)
```

```
x_ph =
```

$$-\mathrm{atan}\left(\frac{\omega}{2}\right)$$

```
figure
yyaxis left
fplot(x_mag)
ylabel("|X(\omega)|")
yyaxis right
fplot(x_ph)
ylabel("\angle X(\omega)")
```



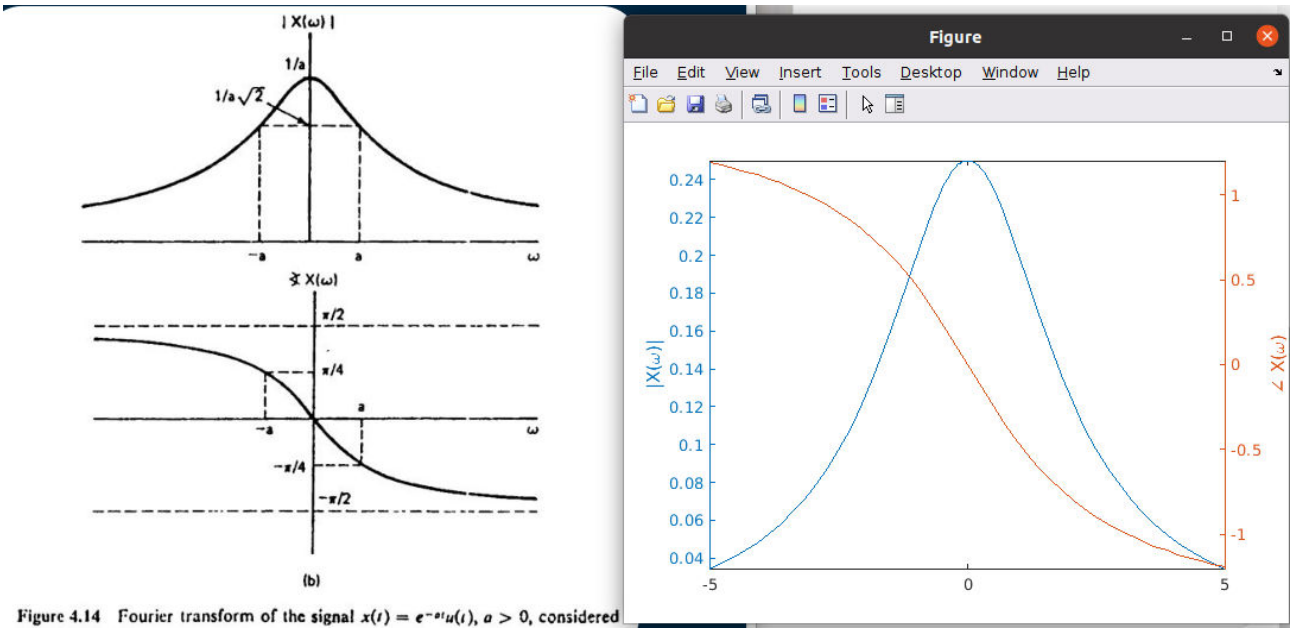
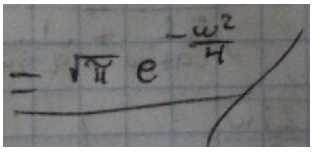


Figure 4.14 Fourier transform of the signal $x(t) = e^{-at}u(t)$, $a > 0$, considered

Segundo ejercicio

$$x(t) = e^{-t^2}.$$

$X(\omega)$ 

Propiedad de Erik

- Plotear
- Usar la función fourier y comparar resultados

```
syms t omega
x=exp(-t^2)
```

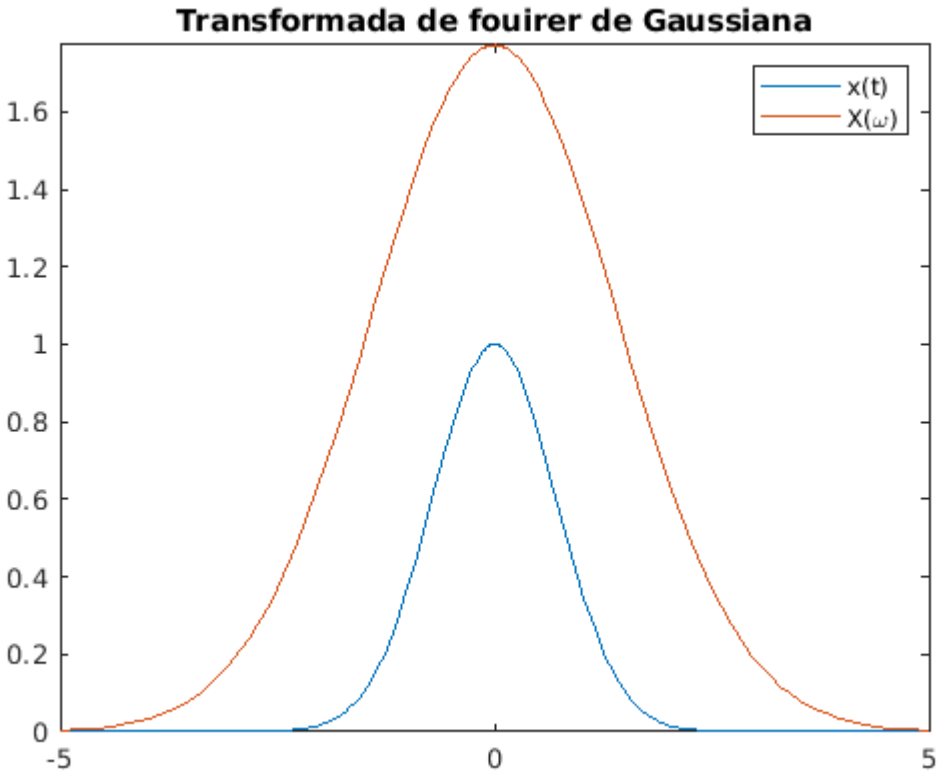
x = e^{-t^2}

```
X=sqrt(pi)*exp(-omega^2/4)
```

x =

$$\frac{3991211251234741\, e^{-\frac{\omega^2}{4}}}{2251799813685248}$$

```
figure
fplot(x)
hold on
fplot(X)
hold off
legend("x(t)","X(\omega)")
title("Transformada de fouirer de Gaussiana")
```

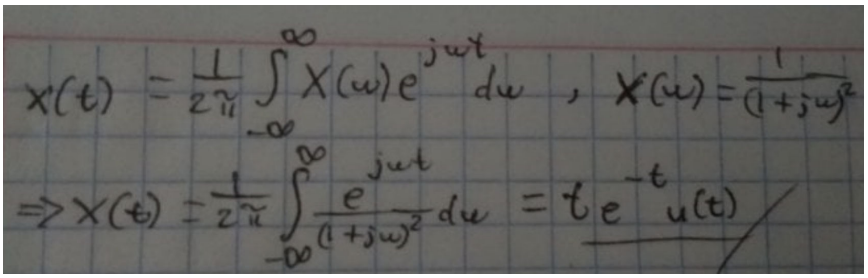



```
% Usando la función fourier
X_sym=fourier(x)
```

```
X_sym =
```

$$\sqrt{\pi}\, e^{-\frac{w^2}{4}}$$

Inversa



Propiedad de Erik

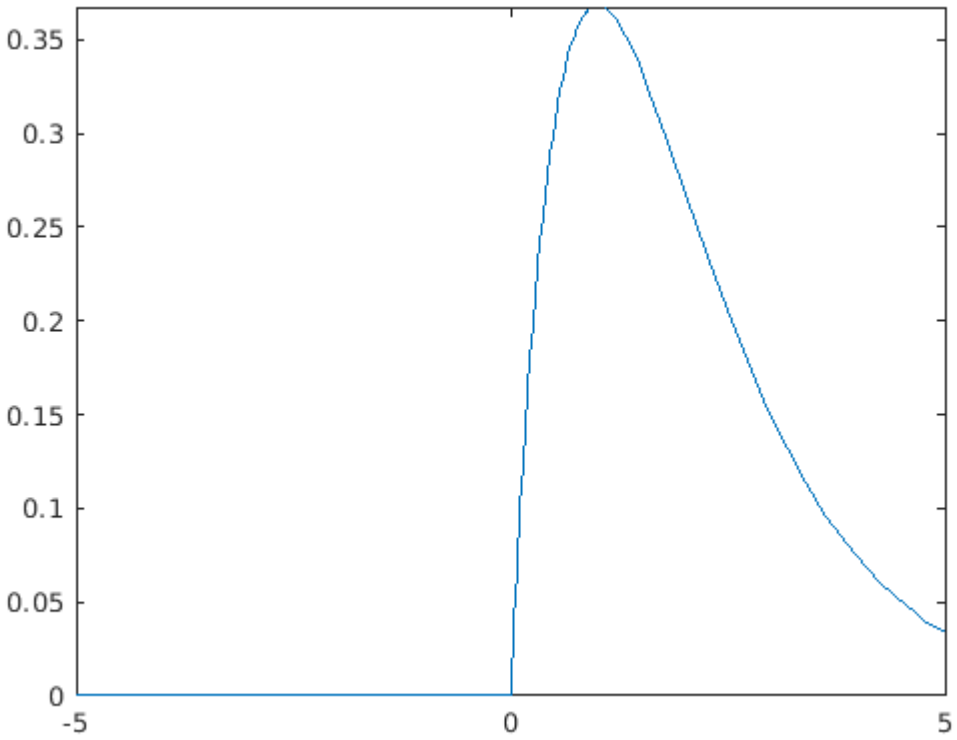
```
%Plotear resultado
x=t*exp(-t)*heaviside(t)
```

```
x =
```

$$t\, e^{-t}\, \mathrm{heaviside}(t)$$

```
figure
```

```
fplot(x)
```

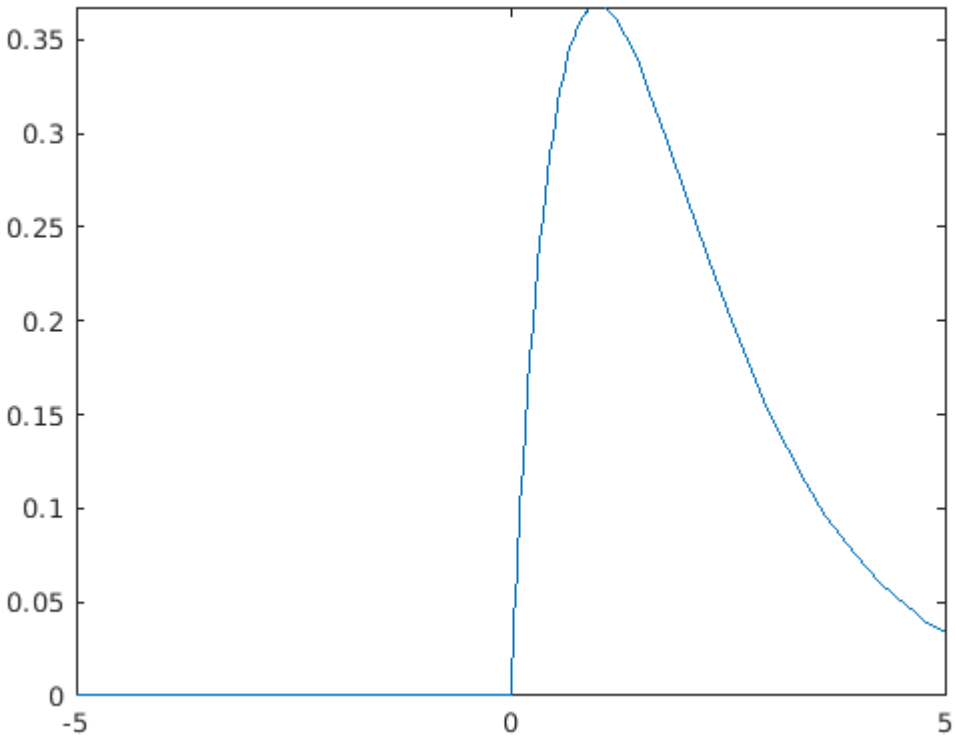



```
%Usar función ifourier
x_sym=ifourier(1/(1+1j*omega)^2,omega)
```

```
x_sym =
```

$$\frac{\pi\,\omega\,\mathrm{e}^{-\omega}+\pi\,\omega\,\mathrm{e}^{-\omega}\,\mathrm{sign}(\omega)}{2\,\pi}$$

```
figure
fplot(x_sym)
```


0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
-5
0
5