Homework 02

(due day in two weeks, 4/22)

Problem 1: (40 points)

A function $f(x) = e^{-a|x|}$, $a > 0$, please find

(1) Fourier integral of *f(x)*

(2) Calculate $\int_0^{\infty} \frac{\cos(2x)}{x^2 + 4} dx$

Answer

Problem 2: (30 points)

Please use Fourier integral to show $\int_0^{\infty}(\frac{2}{4+w^2}\cos wx+\frac{w}{4+w^2}\sin wx)dw=\begin{cases}\pi e^{-2x}, x>0\\ 0, x<0\end{cases}$.

Answer

Problem 3: (30 points)

If $f(x)=\begin{cases}e^{-2x}, x>0\\ 0, \quad x<0\end{cases}$., please find *f(x)'s* Fourier integral.

Answer