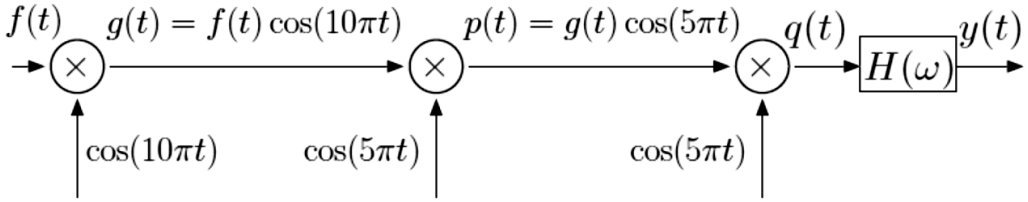
# Digital Filters & Spectral Analysis
# Lecture 3

## The Fourier Transform

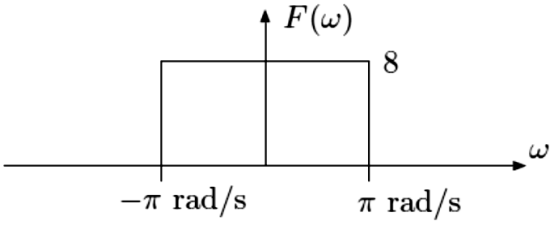
## Problem sheet

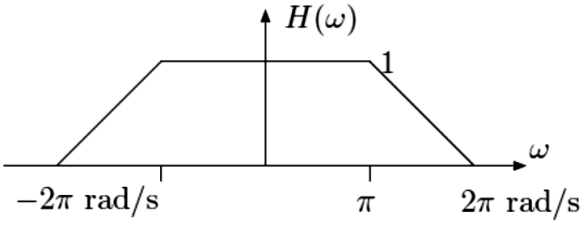
1. Use the frequency shift property to determine the Fourier transform of $f(t)sin(\omega_0 t)$

2. Consider the following system




where $F(\omega)$ and $H(\omega)$ are as shown below:




a) Express $q(t)$ in terms of $p(t)$.

b) Sketch the Fourier transforms $G(\omega)$, $P(\omega)$, $Q(\omega)$, and $Y(\omega)$.

c) Express $y(t)$ in terms of $f(t)$.