2018-Chapter 2 exercises

Problem 1:

The Fourier transform $G(f)$ of a signal $g(t)$ is defined by

$$G(f) = \begin{cases} 1, & f > 0 \\ \dfrac{1}{2}, & f = 0 \\ 0, & f < 0 \end{cases}$$

Determined the signal $g(t)$.

Problem 2:

Evaluate the Fourier transform of the damped sinusoidal wave

$$g(t) = \exp(-t)\sin(2\pi f_c t)\,u(t),$$,where u(t) is the unit function.

Problem 3:

The rectangular RF pulse

$$x(t) = \begin{cases} A\cos(2\pi f_c t), & 0 \le t \le T \\ 0, & \text{elsewise} \end{cases}$$

is applied to a linear filter with impulse response

$$h(t) = x(T - t)$$

Assume that the frequency f_c equals a large integer multiple of $1/T$. Determine the response of the filter.