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ECE

ADC

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8/9/21

1. Given,

$$g(t) = \text{sinc}(t)$$

$$= \frac{\sin(\pi t)}{\pi t}$$

Pre-envelope of $g(t)$ $\quad g_+(t) = g(t) + j\hat{g}(t)$

$$\hat{g}(t) = g(t) * \frac{1}{\pi t}$$

$$\text{sinc}(t) \rightleftarrows \text{rect}(f)$$

$$\frac{1}{\pi t} \longleftrightarrow -j\,\text{sgn}(f)$$

$$G_+(f) = G(f)\,(1 + \text{sgn}(f))$$

$$\frac{\sin at}{at} \longleftrightarrow \frac{\sin^2(at/2)}{at/2}$$

Here $a = \pi$

$$\Rightarrow \frac{\sin \pi t}{\pi t} = \text{sinc}\,t$$

$$\therefore g_+(t) = \frac{\sin^2(\pi t/2)}{\pi t/2}$$