$$50000 = \frac{1}{2}\left(\frac{A_c^2}{50}\right)$$

$$A_c = \sqrt{2(50)(50000)} = 2236\ V$$

2b

$$A_{min} = A_c(1 + A_1\cos(\omega_1 t_{min}) + A_1\cos(2\omega_1 t_{min}))$$

$$A_{max} = (2A_1 + 1)A_c$$

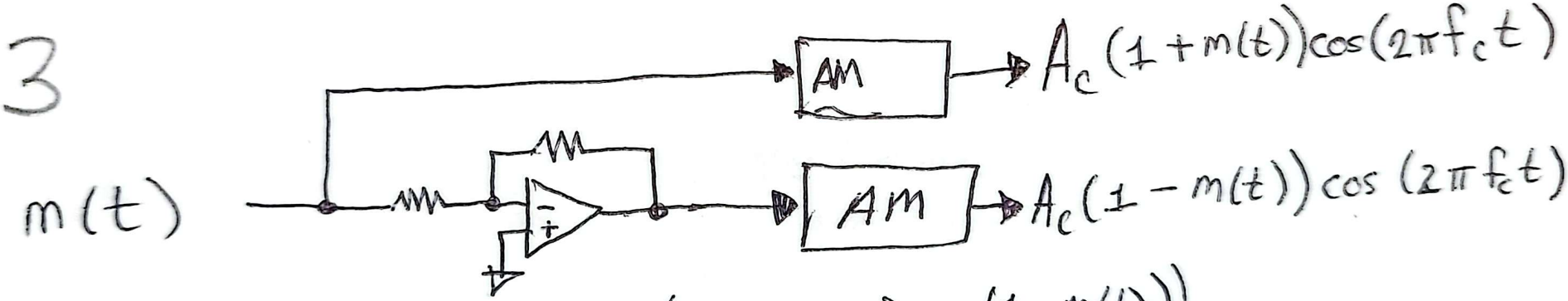
$$0.9 = \frac{A_{max} - A_{min}}{2A_c} = 2A_1 + 1 - 1 + A_1\cos(\omega_1 t_{min}) + A_1\cos(2\omega_1 t_{min})$$

$$0.9 = A_1(2 + \cos(\omega_1 t_{min}) + \cos(2\omega_1 t_{min})$$

$$t_{min} = 0.000\,58043$$

$$A_1 = 1.02857$$

3




$$A_c \cos(2\pi f_c t)\left((1+m(t)) - (1-m(t))\right)$$

$$= 2A_c m(t) \cos(2\pi f_c t)$$

#4 $G(f) = \mathcal{F}\{g(t)\}$

$$= \begin{cases} 2M(f) & f<0 \\ M(f) & f=0 \\ 0 & f>0 \end{cases}$$

$$= 2u(-f)M(f)$$
$$= M(f) + M(f)[2u(-f)-1]$$

$$g(t) = \mathcal{F}^{-1}\{M(f) + M(f)[2u(-f)-1]\}$$

$$= m(t) + m(t) * \mathcal{F}^{-1}\{2u(-f)-1\}$$
$$= m(t) - m(t) * \mathcal{F}^{-1}\{2u(f)-1\}$$
$$= m(t) - j\left[\frac{1}{\pi t} * m(t)\right]$$

$$= m(t) - j\hat{m}(t)$$

5

a) $m(t) = 5\cos(\omega_1 t)$
$\hat{m}(t) = 5\sin(\omega_1 t)$

b) $g_L(t) = 5\cos(\omega_1 t) - j5\sin(\omega_1 t)$

c) $g_{RMS}^2 = \frac{1}{T}\int_{-T/2}^{T/2} g_L(t)^2 dt = 5/\sqrt{2}$

d) $\max(g_L(t)) = 5$

e) $\langle s^2(t) \rangle = \frac{1}{2}\langle |g(t)|^2 \rangle = \frac{25}{2}$

f) $P_{PEP} = \frac{1}{2}(\max(g(t)))^2 = \frac{25}{2}$