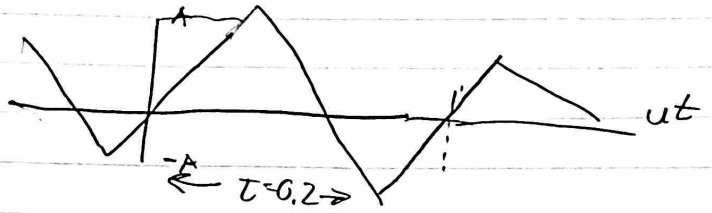
HW 14 Sig-Sys

(5.36) R = 10K AC wave A = 4m A T = 0,25



a) $P_{ave} = A I_{rms}^2 R$ $I_{rms} = \frac{A}{\sqrt{3}} = \frac{4mA}{\sqrt{3}} = 2,309mA$

$P_{ave} = (2.309 \times 10^{-3})^2 (10k) = 0,5333W \simeq 53,33\ mW$

b) $i(t) = \frac{8A}{\pi^2} \sin t = \frac{8A}{9\pi^2} \sin 3t + \frac{8A}{25\pi^2} \sin 5t - \frac{8A}{49\pi^2} \sin 7t$

$i(t) = 3.242 \sin t - 0.36 \sin 3t + 0.1296 \sin 5t - 0.066 \sin 7t$

Rms current $i_{rms} = \sqrt{\left(\frac{3.242}{\sqrt{2}}\right)^2 + \left(\frac{(0.36)^2}{(\sqrt{2})^2}\right) + \left(\frac{0.1296}{\sqrt{2}}\right)^2 + \left(\frac{0.066}{\sqrt{2}}\right)^2}$

$i_{rms} = \underline{2.308mA}$

aprox $P = (2.308)^2 (10k) = 50,0833306) = 53.306mW$

c) % error $= \frac{53,333\ mW - 53,306mW}{53,333\ mW} \times 100 = \underline{0,0506\%}$