

Physics 431/531 Homework 9

Due Tues. Nov 30

1. Text problem 4.10 (page 232).
2. Text problem 4.14 (page 242).
3. A carrier signal of frequency $f_c = 900$ kHz is mixed with a signal produced by audio f_m , where $20 < f_m < 40 \times 10^3$ Hz, to form an amplitude-modulated radio signal $V_s(t)$ which is broadcast. This signal has the form

$$V_s(t) = A[1 + m \cos(\omega_m t)] \cos(\omega_c t)$$

where A is a constant, and m is a constant known as the modulation index.

For one audio frequency, say 10 kHz, what frequencies are present in the broadcast signal? What are their relative amplitudes, $V_s(\omega)/A$? Assume that $m = 1/2$.