Dmitri 3.4)

$$v_2 = a_1 v_1(t) + a_2 v_1^2(t) \quad (1)$$

where, $v_1(t) = A_c \cos 2\pi f_c t + m(t)$ (2)

Subst. eq. (2) into eq (1)

$$v_2(t) = a_1\left[A_c \cos 2\pi f_c t + m(t)\right] + a_2\left[A_c \cos 2\pi f_c t + m(t)\right]^2$$

$$\Rightarrow v_2(t) = \underbrace{a_1 A_c\left[1 + \frac{2a_2}{a_1} m(t)\right] \cos 2\pi f_c t}_{\text{AM Signal}} + a_1 m(t) + a_2 m^2(t) + a_2 A_c^2 \underbrace{\cos^2(2\pi f_c t)}_{\frac{1}{2}\left[1 + \cos 4\pi f_c t\right]}$$

The signal at the output of bandpass filter is:

$$v_0(t) = a_1 A_M\left[1 + \frac{2a_2}{a_1} m(t)\right] \cos 2\pi f_c t$$

which is an AM wave.