Problem 6.11

The transmission bandwidth B_T is related to the excess bandwidth f_v by the formula (see Eqs. (6.21) and (6.22))

$$B_T = B_0 + f_v$$

where $B_0 = 1/(2T_b)$. We may therefore express the bit rate $1/T_b$ as a function of the excess bandwidth f_b as follows:

$$\frac{1}{T_b} = 2(B_T - f_v) \tag{1}$$

From Eq. (1), we see that the bit rate $1/T_b$ decreases linearly with the excess bandwidth f_v for a fixed channel bandwidth B_T . Specifically, with $B_T = 3$ kHz, the bit rate versus excess bandwidth graph takes the form shown in Fig. 1. Note that the excess bandwidth f_v attains its largest value when the roll-off factor α equals unity, in which case $f_v = 3$ kHz.

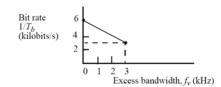


Figure 1