Problem 10.20. The Hamming (7,4) encoded sequence 1001000 was received. If the number of transmission errors is less than two, what was the transmitted sequence?

Solution

The syndrome of the received sequence is $\mathbf{S} = \mathbf{R}\mathbf{H}$ where **H** is defined by (10.92).

$$\mathbf{S} = \mathbf{R} \cdot \mathbf{H}$$

$$= [1001000] \cdot \begin{bmatrix} 101 \\ 111 \\ 110 \\ 011 \\ 100 \\ 010 \\ 001 \end{bmatrix}$$

$$= [110]$$

Based on Table 10.4, the error vector **E** = [0010000]. The transmitted sequence is $\mathbf{E} \oplus \mathbf{R}$ = [1011000].