

1. DM system:

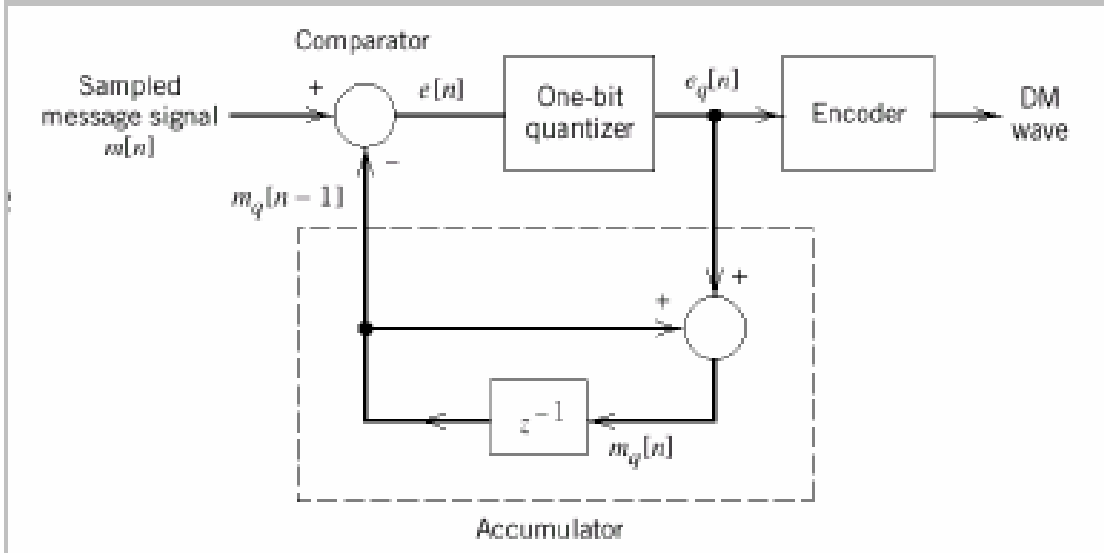
(a) Draw the block diagram of DM system.

(b) Briefly describe what **slope-overload distortion** and **granular noise** are.

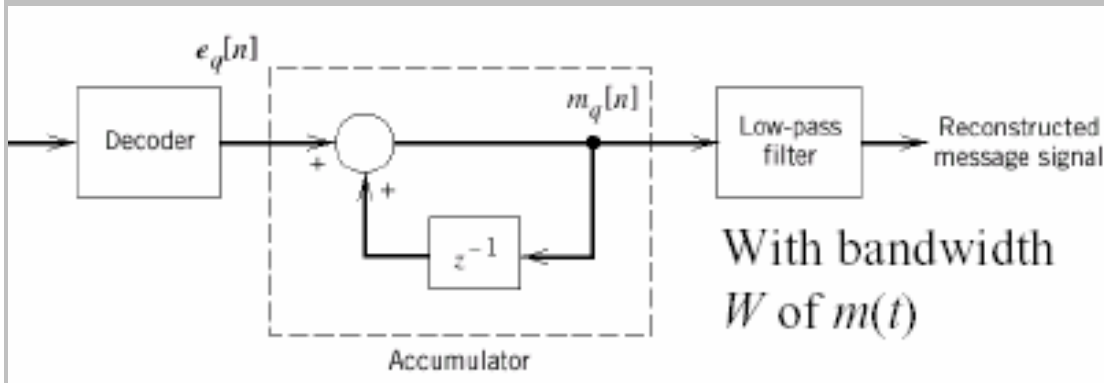
Sol:

(a)

Tx:



Rx:



(b)

Slope overload distortion

■ To eliminate the slope overload distortion, it requires

$$\frac{\Delta}{T_s} \geq \max \left| \frac{dm(t)}{dt} \right| \quad (\text{slope overload condition})$$

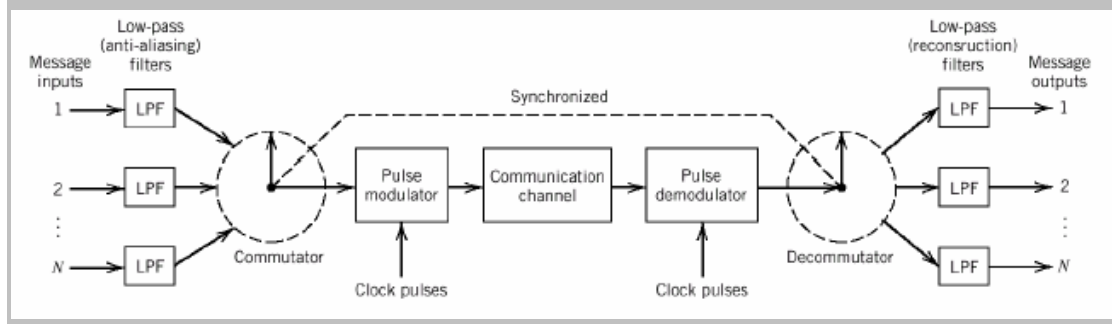
Granular noise

- $m_q[n]$ will hunt around a relatively flat segment of $m(t)$.
- A remedy is to reduce the step size.

2. TDM system:

(a) Draw the block diagram of TDM system

Sol:



3. Delta-sigma modulation system:

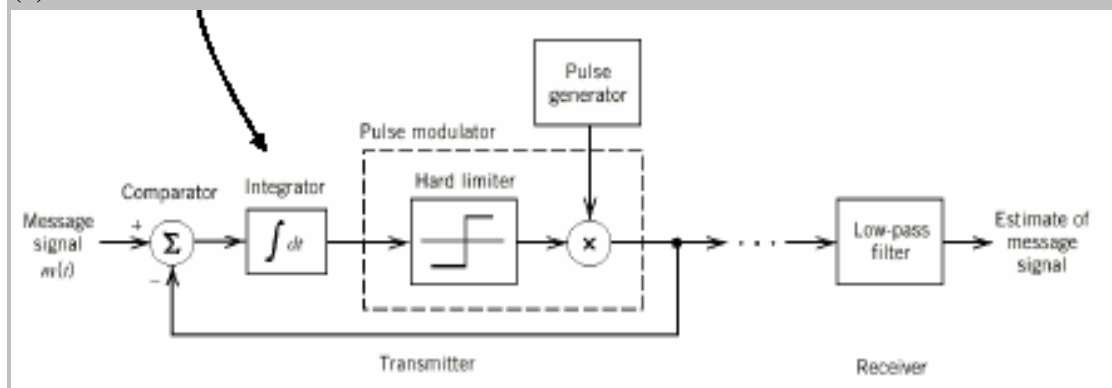
(a) Draw the block diagram of Delta-sigma modulation

(b) Explain the function of each block in (a)

(c) Illustrate the advantage of the Delta-sigma modulation compared with DM system.

Sol:

(a)



(c) receiver design is further simplified