

SOFT



$$R = \frac{16}{31}$$

$$p(E) \leq Q \left(\sqrt{\frac{2Eb}{N_0} \cdot R \cdot d^4} \right)$$

$$= Q \left(\sqrt{\frac{2Eb}{N_0} \cdot \frac{16}{31} \cdot 7} \right)$$

\downarrow
dmin

2.2

HARD

HARD

$$t = \left\lfloor \frac{dmin - 1}{2} \right\rfloor = 3 \rightarrow Q \left(\sqrt{\frac{2Eb}{N_0} \cdot R \cdot (t+1)} \right)$$

$$p(E) \leq 155 \cdot Q \left(\sqrt{\frac{2Eb}{N_0} \cdot R \cdot 7} \right)$$

$$+ 456 \cdot Q \left(\sqrt{\frac{2Eb}{N_0} \cdot R \cdot 8} \right)$$

$$+ 5208 \cdot Q \left(\sqrt{\frac{2Eb}{N_0} \cdot R \cdot 11} \right)$$

SOFT

If we add a final parity check bit (even number of 1s)

$$(155 \text{ words} + 465 \text{ words}) \Rightarrow 8 \text{ over}$$

$$5208 \text{ words} \Rightarrow 12 \text{ over}$$

$$1 \text{ word} \Rightarrow 0 \text{ over}$$

$$N=32$$

$$L = \text{[scribbled out]}$$

$$K=16$$

$$N=16$$

$$\rightarrow N=32$$

$$N=32$$

$$R = 1/2$$