

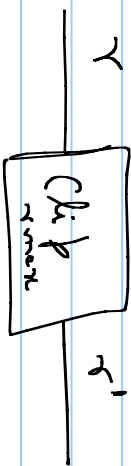
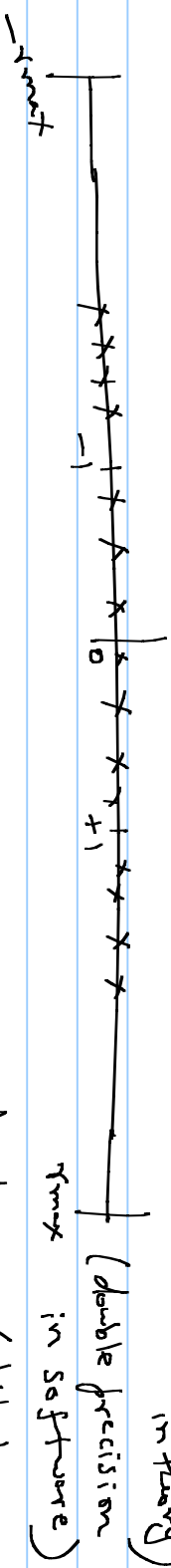
BPSK:  $0 \rightarrow +1$

$1 \rightarrow -1$

$x(0) - 1$   
Gaussian  
mean: 0  
var:  $\sigma^2$

Received value:  $r = s + n$

$r$ : real value (infinite precision in theory)



$$r' = \begin{cases} -r_{\max}, & \text{if } -r_{\max} < r < +r_{\max} \\ r_{\max}, & \text{if } r < -r_{\max} \\ -r_{\max}, & \text{if } r > r_{\max} \end{cases}$$

$r_{\max} = 3 \text{ on } 4$

hardware: 6 bits per received value

$r'$ : quantized to 6 bits

1 bit: sign

5 bits: magnitude

maxint = 31

Quantized value

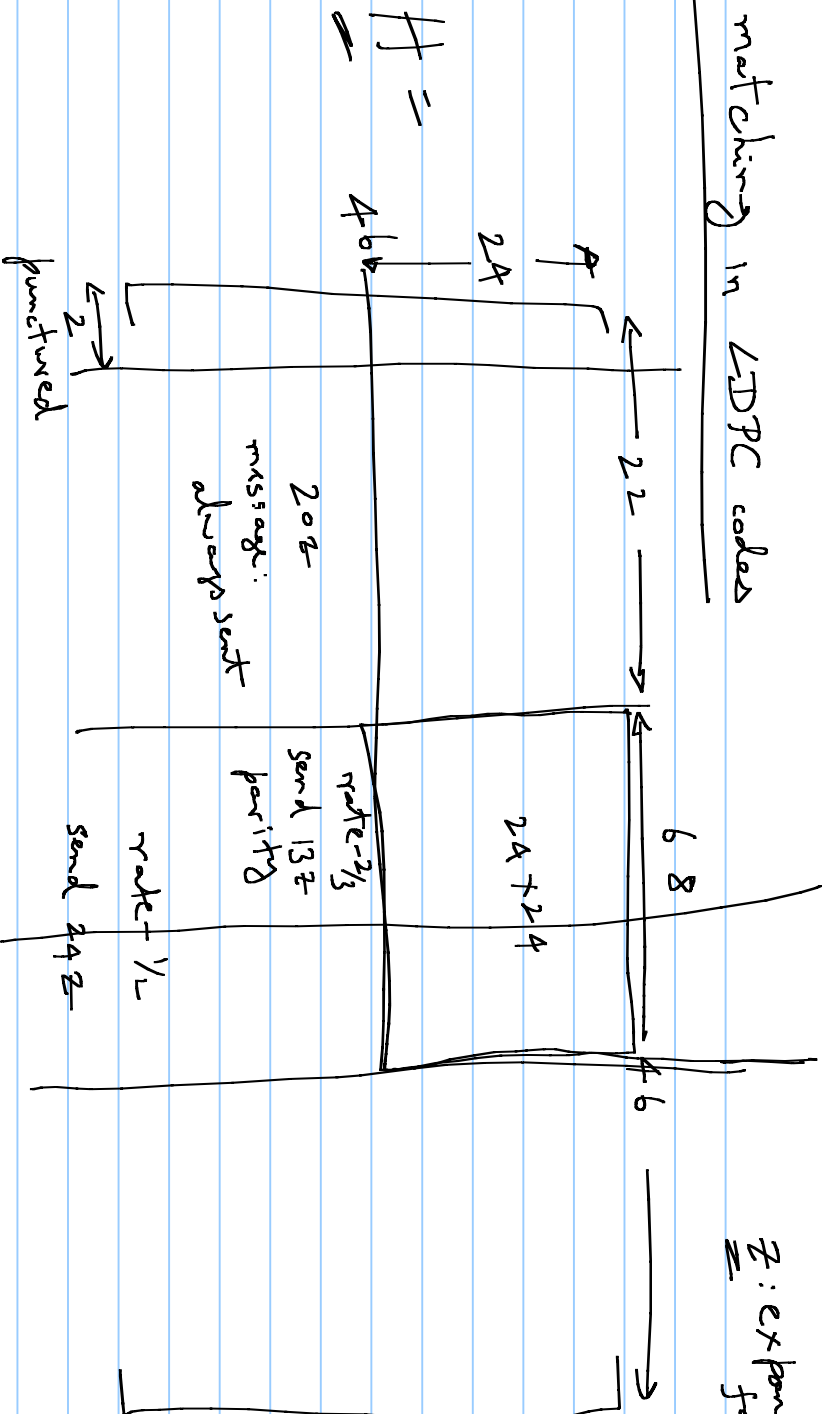
$$\text{int} \left( \frac{r'}{r_{\max}} \times \text{maxint} \right)$$

integers from

-31 to 31

# Rate matching in LDPC codes

$Z$ : expansion factor



$$H =$$

# of possible codeword bits:  $68Z$

first  $2Z$ : punctured (message)

rate  $2/3$

message bits:  $22Z$

rate  $2/3$ : first  $33Z$  bits are

from initial  
( $20Z$ : message  
 $13Z$ : parity)

rate  $1/2$ :

first  $44Z$  bits are transmitted (last  $22Z$  bits are punctured)  
( $20Z$ : message  
 $24Z$ : parity)

Decoder:  $13 \times 35$  left-top part

Decoder:  $24 \times 46$  left-top part of  $H$  is used

CRC:

$$L=11$$

$$\text{poly: } x^{11} + x^{10} + x^7 + x^5 + 1$$