Class 18 continued [Refer to Class 16 for prev notes for Class 18]. classnotes pdf

Generic statements to build up to later topics :-

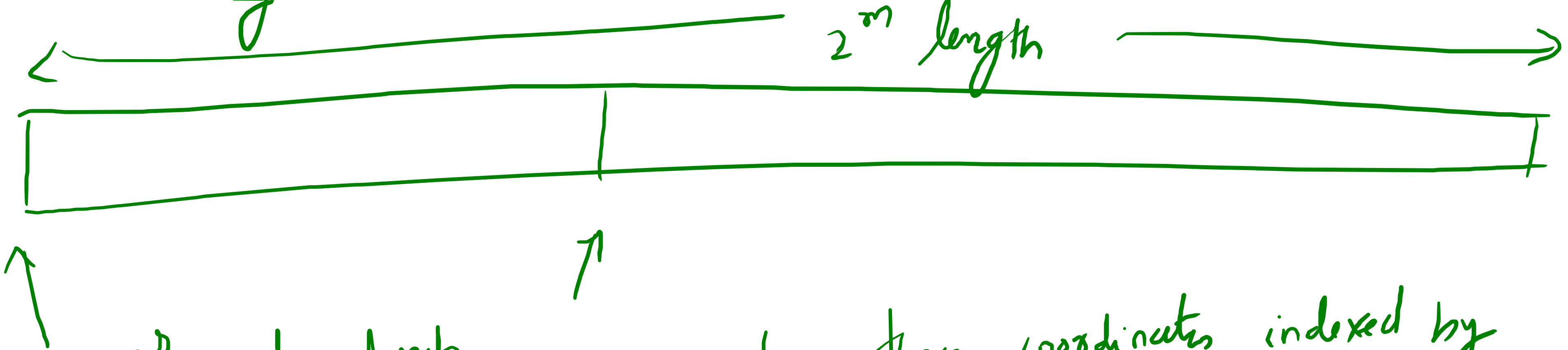
[To be done from 'Recursive Projection Aggregation' decoding of Reed Muller Codes - Min Ye, Emmanuel Abbe Feb 2020.]

→ This paper uses a iterative reduction of $RM(m,r)$ code to $RM(m-s, r-s)$ code for $s = 1, 2, \ldots, r-1$.

→ When algo 'hits' $RM(m-r+1, 1)$ scenario, use FHT to decoded.

Rehashing the Reed: Majority logic algorithm :

To find coefficient of $X_1 \ldots X_r$ in msg polynomial from received vector $\underline{y}$.

$\underline{y} =$ 

2^r sized subvectors given by those coordinates indexed by

$\underline{X} : (X_{r+1} = 0, \ldots, X_m = 0)$

add the rx values in this position to get one bit $\longrightarrow$ Then do similar process for every choice of $(X_{r+1}, \ldots, X_m) \rightarrow$

$\rightarrow$ 2^{m-r} estimates $\rightarrow$ Majority of them will be correct, provided $< 2^{m-r-1}$ errors happened.

$\rightarrow$ Hence Maj (bits obtained by aggregation) = estimate of coeff of $x_1 \ldots x_r$.