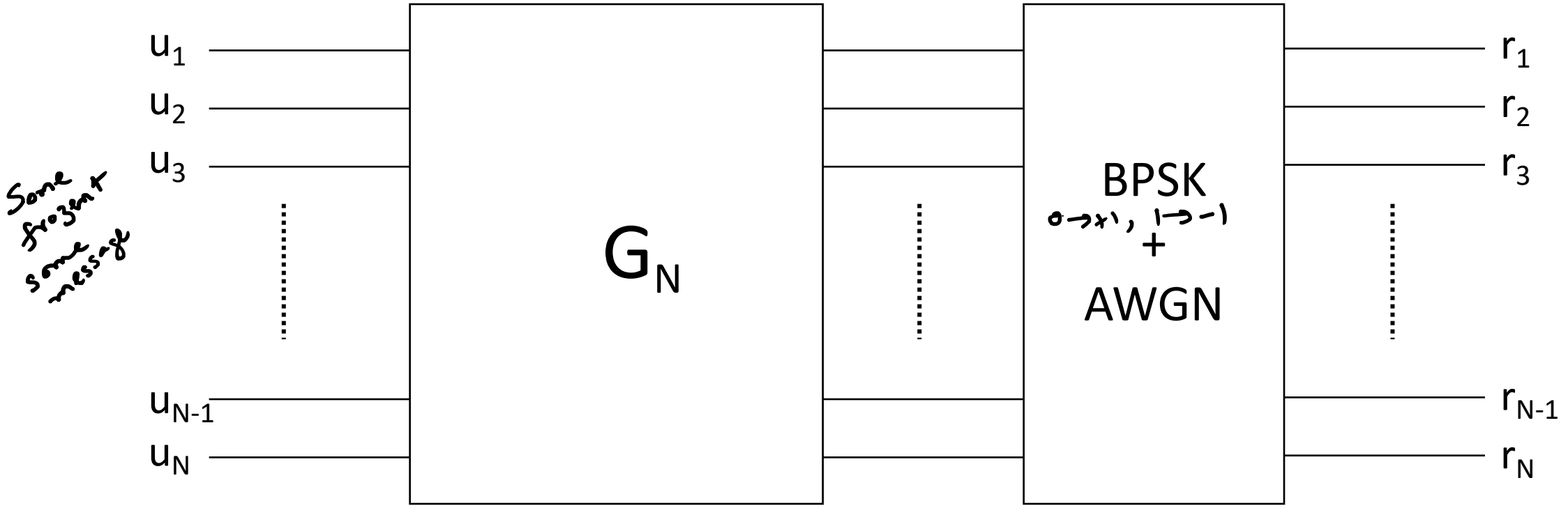
Polar Codes

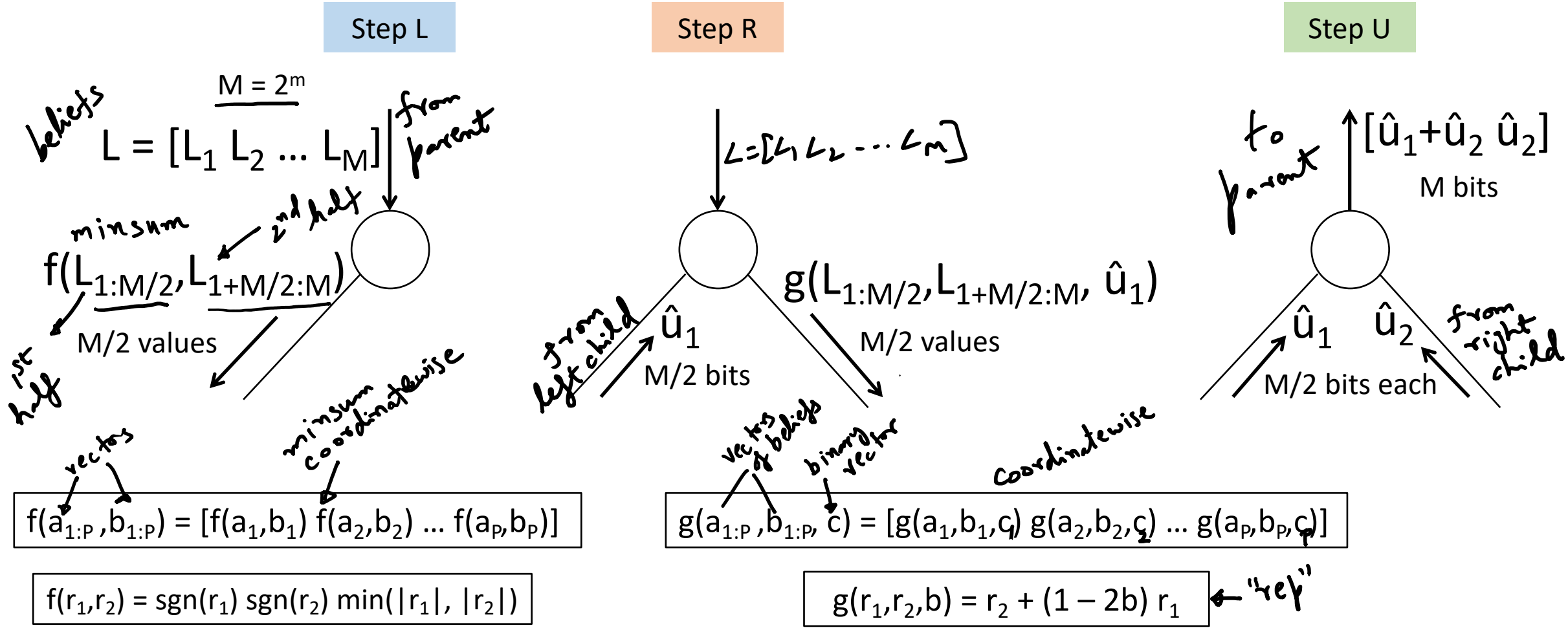
Successive Cancellation Decoding

SC decoder setup

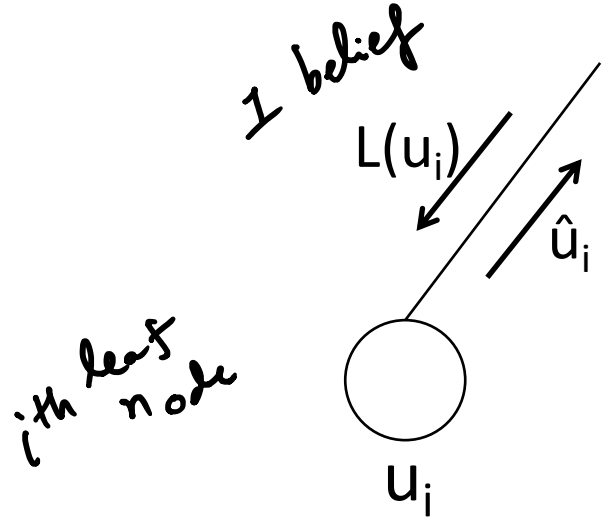


$r^{(N)} = [\ r_1\ r_2\ r_3\ \ldots\ r_N\ ]$: received vector

SC decoder: operations in an interior node



SC decoder: decision in a leaf node



If `i' is a frozen position: $\hat{u}_i = 0$

If `i' is a message position: $\hat{u}_i = 0$, if $L(u_i) \geq 0$; $\hat{u}_i = 1$, if $L(u_i) < 0$

SC decoder: sequence of operations

- Start at root

At every node… (when it is activated)

- If not leaf, do the following in sequence
  - Do Step L and go to left child
  - When decision is received from left child, do Step R and go to right child
  - When decision is received form right child, do Step U and go to parent
- If leaf, make decision and go to parent

SC decoder example: sequence of operations