5. Summary

The **binary tree structure** in polar coding is a direct consequence of the recursive Kronecker construction of $F^{\otimes n}$:

- Encoding corresponds to an **upward traversal**, combining input bits into codewords.
- Decoding corresponds to a **downward traversal**, using recursive likelihood calculations to recover input bits.
- The tree structure enables efficient $O(N \log N)$ encoding and decoding while visually representing the channel polarization process.

In [ ]: