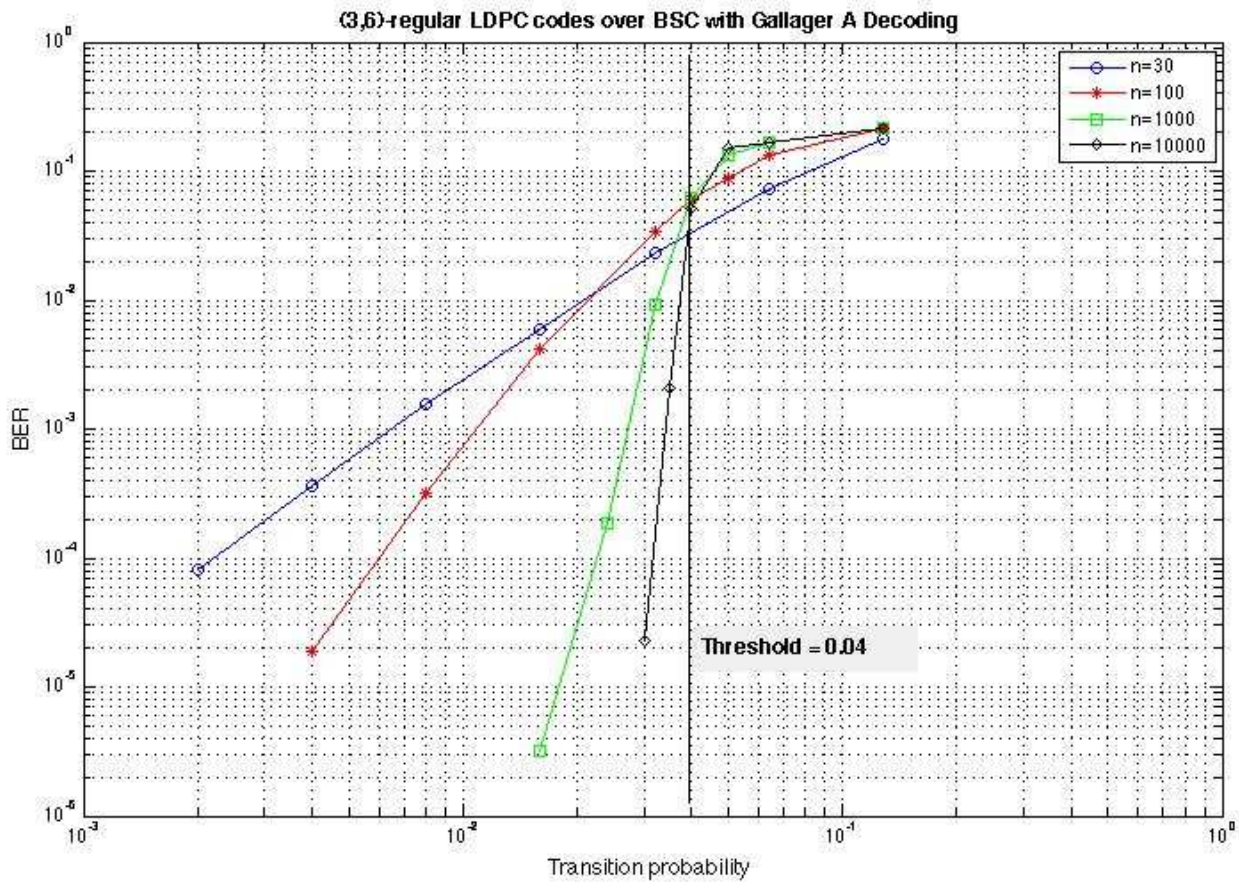


# Lecture 23:



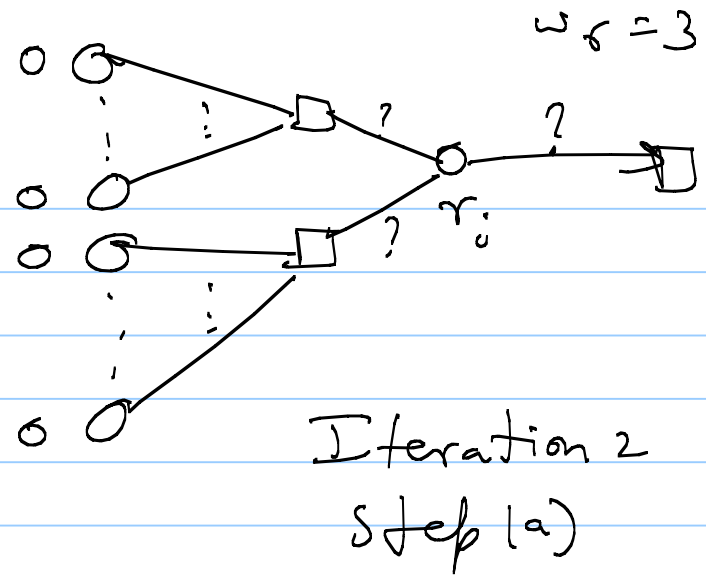
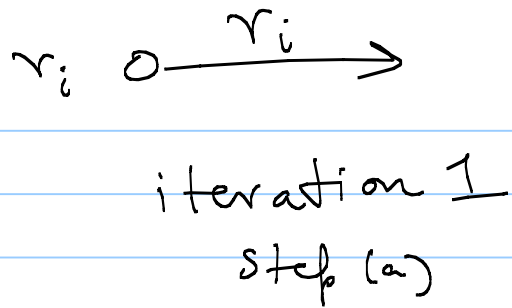
→  $p^{(l)} = \text{Prob} \{ \text{message from bit-to-check} = 1 \}$

$$p^{(l)} = f_{w_r, w_c} (p^{(l-1)}, p) \quad p^{(0)} = p$$

→ Analytical properties such as monotonicity (w.r.t.  $p + p^{(l-1)}$ ), fixed-points etc.

$$p^* = \max \{ p : p^{(l)} \rightarrow 0 \}$$





All-zero codeword assumption:

$$\begin{aligned}
 \Pr(\hat{c} \neq c) &= \sum_{u \in C} \underbrace{\Pr(\hat{s} \neq u | c = u)}_{\downarrow} \cdot \Pr(c = u) \\
 &= \Pr(\hat{c} \neq u | c = u)
 \end{aligned}$$

→ channel symmetry  
 "Modern Coding Theory", Rudiger Urbanke,  
 Thomas Richardson