

Definition 7.19 A rate R is achievable with complete feedback for a discrete memoryless channel $p(y|x)$ if for any $\epsilon > 0$, there exists for sufficiently large n an (n, M) code with complete feedback such that

$$\frac{1}{n} \log M > R - \epsilon$$

and

$$\lambda_{max} < \epsilon.$$

Definition 7.20 The feedback capacity, C_{FB} , of a discrete memoryless channel is the supremum of all the rates achievable by codes with complete feedback.

Proposition 7.21 The supremum in the definition of C_{FB} in Definition 7.20 is the maximum.

Proof Follows from Definition 7.19. See textbook for details.

Remark Since a channel code without feedback is a special case of a channel code with complete feedback, $C_{FB} \geq C$.