On the Capacity of the Flash Memory Channel with Intercell Interference

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Abstract: In this paper, we consider a discrete channel with inter-cell interference (ICI) for NAND flash memory. We first show that for a general indecomposable finite-state channels, the operational capacity is equal to the stationary capacity. Together with the result that Markov processes asymptotically achieves the stationary capacity, we show that Markov processes asymptotically achieves the operational capacity. Then we consider the NAND flash memory channel with ICI with Markovian inputs and derive the explicit formula of the mutual information rate. Using this formula and that stationary capacity is equal to the operational capacity, we obtain the asymptotics of the channel capacity in the high signal-to-noise regime. We numerically compute the lower and upper bounds on the channel capacity.