Consider a binary stationary Markov source \( \{X_n\} \) with transition probability

\[
Pr\{X_{n+1} = 1|X_n = 0\} = Pr\{X_{n+1} = 0|X_n = 1\} = \frac{1}{4}.
\]

Suppose we wish to encode the output of this source and transmit the result over a binary symmetric channel (BSC) with crossover probability \( \epsilon \). For what values of \( \epsilon \) can this source be reliably transmitted (with asymptotically vanishing probability of error) over this channel? (Assume that the source and channel signaling rates are equal.) [Hint: \( h_b(0.25) = 0.811 \) and \( h_b(0.029) = 0.189 \).]