

Discussion 6 - Solution

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*Problem 1.* (Optional) In this problem, we study the Ideal Soliton Distribution (ISD).

Assume that the decoder has recovered  $x$  chunks out of  $k$  chunks.

(a) The release probability  $q(d, x)$  is the probability that a coded symbol of degree  $d$  becomes ‘resolvable’ for the first time when  $x$  symbols are found. Find  $q(d, x)$ .

(b) The overall release probability  $r(x)$  is the probability that a *random* coded symbol becomes ‘resolvable’ for the first time when  $x$  symbols are found. Find  $r(x)$  using  $p$  and  $q$ .

(c) Ideal Soliton Distribution (ISD) is defined as follows:

$$p_{\text{ISD}}(d) = \begin{cases} \frac{1}{k} & d = 1 \\ \frac{1}{d(d-1)} & d > 1. \end{cases}$$

Find  $r(x)$  when  $p_{\text{ISD}}$  is used.

*Problem 2.* After attending an EE126 lecture, you went back home and started playing *Twitch Plays Pokemon*. Suddenly, you realized that you may be able to analyze *Twitch Plays Pokemon*.



Figure 1: A snapshot of ‘Twitch Plays Pokemon’ - 1

- (a) Find the expected number of moves until Red reaches the stairs in Figure 1.
- (b) Find probability that Red reaches the stairs in the bottom right corner in Figure 2.



Figure 2: A snapshot of 'Twitch Plays Pokemon' - 2