Abstract

In distributed storage, cooperative repair is to simultaneously recover h (h>1) node erasures by downloading data from surviving nodes as well as collaboration between the h replacement nodes. In this work, we propose a generalized cooperative repair framework for Reed-Solomon (RS) codes with two erasures. The key idea is to construct parity-check polynomials for the two replacement nodes respectively and then reduce the repair problem to the design of a linearized permutation polynomial related to the parity-check polynomials. We provide constructions of the linearized permutation polynomial in several cases, leading to cooperative repair schemes accordingly. Compared with the schemes given by [Dau. et al. TIT 2021], our schemes retain the same repair bandwidth while apply to a much wider parameter regime and need only one-round collaboration.