

# Fault tolerant interval group testing

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We study the following fault tolerant variant of the interval group testing model: Given three positive integers  $n, p, e$ , determine the minimum number of questions needed to identify a (possibly empty) set  $P \subset \{1, 2, \dots, n\} (|P| \leq p)$ , under the following constraints. Questions have the form “Is  $I \cap P \neq \emptyset$ , where  $I$  can be any interval in  $\{1, 2, \dots, n\}$ . Up to  $e$  of the answers can be erroneous or lies. Questions are to be organized in batches of non-adaptive questions. Therefore, questions in a given batch can be formulated relying only on the information gathered with the answers to the questions in the previous batches. The study of interval group testing is motivated by several applications. Among others, it has applications to the problem of identifying splice sites in a genome. To the best of our knowledge, we are the first to consider fault tolerant strategies for interval group testing. We completely characterize the fully non-adaptive situation and provide tight bounds for the case of two batch strategies. Our bounds only differ by a factor of  $\sqrt{11/10}$  for the case  $p = 1$  and at most 2 in the general case.