

1173-05-256

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Combinatorial Union Busting with Stopped Strings. Preliminary report.

A factory manager purchases an experimental machine and subjects it to a testing regime. The machine is certified as soon as it consecutively passes half of its total tests. That is, the testing process produces a binary string $(b(1), b(2), \dots)$ (0 = pass, 1 = fail), and we say that the string is “stopped” at time T provided that $b(k) = 0$ for all k in $(T/2, T]$. The “stopping time” of the string is the smallest such T , if any exist, and infinity otherwise. We will show that the binary strings of length n with stopping time n are enumerated by the Narayana-Zidek-Capell numbers (OEIS A2083), then generalize our results to get an infinite family of analogous sequences not in the OEIS. We will answer and pose related questions and generalizations such as, “how likely is a random binary sequence likely to have a finite stopping time?” and “what integers have a ‘stopped’ binary expansion?” (Received September 21, 2021)