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Theory and Application of Feedback Shift Registers

A progress review on the analysis and synthesis of linear and nonlinear feedback shift registers is presented in a document which contains an excellent historical review of the literature in addition to the underlying theory and application of digital techniques. The material is presented at a working level that is readily adaptable to hardware implementation. Originally intended to summarize the state-of-the-art in data processing techniques on-board spacecraft, the report also serves as an excellent background for personnel requiring tutorial knowledge of ultrareliable data processing techniques.

The usefulness of the document is enhanced by the hardware section dealing with NAND gates and RS flip-flops. Various problems and solutions are presented, along with the appropriate state diagrams and logic functions. Included in the appendix is a theoretical effort which presents the mathematical derivation of the minimal polynomial of a square matrix and the characteristic polynomial associated with the near-maximal length cycles of linear feedback shift registers.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
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Reference: B71-10451

Patent status:

No patent action is contemplated by NASA.

Source: M. Perlman of
Caltech/JPL
under contract to
NASA Pasadena Office
(NPO-11486)