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Recurrence sequences. (English)
Mathematical Surveys and Monographs. 104. Providence, RI: American Mathematical Society (AMS). xiii, 318 p. $ 79.00 (2003). [ISBN 0-8218-3387-1/hbk]

This monograph gives a very broad and up to date encyclopaedic overview of both the theory and applications of recurrence sequences. The authors consider mainly sequences over the rationals and over the ring of residue classes modulo an integer. The emphasis is on linear recurrence sequences, but also much attention has been paid to other type of recurrence sequences, for instance sequences generated by finite automata. The book contains an enormous amount of facts and results of which clearly not all proofs have been included. The authors have followed the policy to give proofs or sketches of proofs of the prototypical results, providing convenient references for the proofs that have not been included. At the end of the book there is a bibliography with 1382 items.
We give a short overview of the topics that have been treated: techniques from p-adic analysis and Diophantine approximation; zeros and growth properties of linear recurrence sequences over the integers; periodicity properties of recurrence sequences over residue class rings and Artin's conjecture; operations on power series and linear recurrence sequences; character sum estimates and bounds on the number of zeros of recurrence sequences over residue class rings; arithmetic properies of recurrence sequences (e.g., occurrence of prime divisors or powers in the terms of a recurrence sequence); distribution of recurrence sequences in finite fields and residue class rings; uniform distribution properties of real recurrence sequences; elliptic divisibility sequences; sequences arising in graph theory and dynamics; connections with algebraic number theory (e.g., the construction of normal bases and results on Gaussian periods); pseudo-random number generators; connections to computer science (e.g., sequences generated by finite automata), coding theory and cryptography.

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Keywords : recurrence sequences; applications of recurrence sequences; finite automata; cryptography
Classification :
  ∗11B37 Recurrences
   11-02 Research monographs (number theory)
   11B39 Special numbers, etc.
   11G05 Elliptic curves over global fields
   11T23 Exponential sums
   33B10 Elementary functions
   11J71 Distribution modulo one
   11K45 Pseudo-random numbers, etc.
   11B85 Automata sequences
   37B15 Cellular automata
   94A60 Cryptography
Cited in ...