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Linear Complementary Equations and Systems,
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Abstract

After a brief history of complementary equations, a definition is given for linear complementary equations, with particular attention to examples typified by $a_n = a_{n-1} + a_{n-2} + b_n$, where (b_n) is the complement of (a_n) in the set \mathbb{N} of positive integers, and $a_n/a_{n-1} \rightarrow (1 + \sqrt{5})/2$. Also introduced are systems of equations whose solutions are sequences that partition \mathbb{N} . An example is the system defined recursively by $a_n =$ least new k , $b_n =$ least new k , and $c_n = a_n + b_n$, where “least new k ”, also known as “mex”, is the least integer in \mathbb{N} not yet placed. The sequence (c_n) in this example is the anti-Fibonacci sequence, A075326 in the Online Encyclopedia of Integer Sequences.