

Problem 1 of 5

Find the Sprague-Grundy function for the subtraction game with subtraction set $\{1, 3, 4, 7\}$. Justify your answer.

Problem 2 of 5

Consider the take-away game with the rule that you may remove any number of chips divisible by three. The terminal positions are 0, 1, and 2. Find the formula for Sprague-Grundy function.

Problem 3 of 5

A crippled queen game is played on the board of the size $2 \times n$, $n \in \mathbb{N}$. Find a formula for Sprague-Grundy function. Justify your answer.

Problem 4 of 5

The game is played by the following rules. There are four piles of chips. Players can take any number of chips from any of the first two piles or any number of chips divisible by three from the third or fourth pile. Find the Sprague-Grundy function of the initial position $(51, 27, 17, 49)$. Justify your answer.

Problem 5 of 5

Consider a partizan subtraction game with the subtraction set for the first player $S_1 = \{1, 3, 4\}$, and the subtraction set for the second player $S_2 = \{1, 2\}$. Find all the winning positions for the first player. Justify your answer.