

Characterizing the Set Chromatic Number of the Zero-Divisor Graph of a Finite Ring

Marie Cris B. Mahinay
University of the Philippines Cebu, Cebu City, Philippines
mabulay-og@up.edu.ph

This is joint work with Maria Czarina T. Lagura-Arreza and Reginaldo M. Marcelo

Let $c : V(G) \rightarrow \mathbb{N}$ be a vertex coloring of a simple nontrivial connected graph G , where adjacent vertices may be assigned the same color. For each vertex $v \in V(G)$, the *neighborhood color set* of v , denoted by $NC(v)$, is defined as the set of colors assigned to the neighbors of v . A coloring c is called a *set coloring* if for every pair of adjacent vertices $u, v \in V(G)$, the neighborhood color sets of u and v are distinct, that is, $NC(u) \neq NC(v)$. The *set chromatic number* of G , denoted by $\chi_s(G)$, is the minimum number of colors required in a set coloring of G . In this paper, we focus on the set coloring problem for the zero-divisor graph of the ring of integers modulo n , denoted by $\Gamma(\mathbb{Z}_n)$. The vertices of this graph correspond to the nonzero zero-divisors of \mathbb{Z}_n , and there is an edge between two vertices a and b if and only if $ab \equiv 0 \pmod{n}$. Our objective is to determine the set chromatic number $\chi_s(\Gamma(\mathbb{Z}_n))$ for all values of $n \in \mathbb{N}$.

References

- [1] G. Chartrand, F. Okamoto, F. Rasmussen, P. Zhang, The set chromatic number of a graph. *Discussiones Mathematicae, Graph Theory* **29** (2009) 545–561.