

CHROMATIC NUMBER OF COMMUTATIVE SEMIRINGS

W.B.Vasantha Kandasamy and K. Paramasivam

The chromatic number of graph G , $\chi(G)$ is defined as the minimum n for which G has an n -colouring. The study of chromatic number $\chi(R)$ of a commutative ring R was carried out by Istvan Beck (1988). In (2003) we have studied the chromatic number $\chi(KG)$ of a commutative group ring. Later we have studied the chromatic number of commutative non-associative ring.

In this paper we define the chromatic number of commutative semiring and introduce a new class of commutative semirings using Z_2 and find its chromatic number. These new class of semirings are nothing but collection of all $m \times n$ matrices with entries from the prime field $Z_2 = \{0, 1\}$ with max-min operations which we denote by $S_{m \times n}^2$. We have proved the chromatic number of the new class of semirings $S_{m \times n}^2$ in m.n. i.e., $\chi(S_{m \times n}^2) = mn$. We have further investigated the chromatic number of the distributive lattices L which also from a class of semirings. We have proved for the class of all chain lattices C_n of any length n finite or infinite the chromatic number is 2 i.e., $\chi(C_n) = 2$. For some non-chain lattices, which are distributive, the chromatic number has been determined. Finally the chromatic number of Boolean algebras are also analyzed.

All Rights Reserved. This work is Copyright © W.B.Vasantha Kandasamy, and K. Paramasivam, 2003. Mathematicians can use the above material for research purposes, but the work of the author(s) ***must*** be acknowledged. Violators of copyright, and those indulging in *plagiarism* and *intellectual theft* are liable for strict prosecution.

e-mail: vasantha@iitm.ac.in
web: <http://mat.iitm.ac.in/~wbv>