ABSTRACT

This thesis is divided into six chapters. The first two chapters consists of basic concepts and terminology of graphs and hypergraphs. In the third chapter, a formula for the coefficient of $\lambda^{n-gh+g-1}$ in the chromatic polynomial of a linear h-uniform hypergraph H of order n and girth g is derived provided $(g, h) \neq (3,3)$. The fourth chapter is about the chromaticity of multi-bridge hypergraphs. In this chapter it is proved that the multisets of path lengths of two chromatically equivalent multi-bridge hypergraphs are equal provided the multiplicities of path lengths are bounded above by $2^{h-1} - 2$. Also, it is shown that h-uniform linear cycles of length m are not chromatically unique for every $m, h \geq 3$. In the fifth chapter, the chromatic polynomial of series-parallel hypergraphs is computed with polynomial complexity. It is further shown that the multibridge hypergraphs $\theta(h; a_1, a_2, \ldots, a_k)$ are chromatically unique for $h \geq 3$ if and only if $h = 3$ and $a_1 = a_2 = \ldots = a_k = 1$. Also some open problems are suggested in the sixth chapter.