

Abstract

In the first chapter we introduce the theory of numerical semigroups and, in particular, define the Frobenius number and other semigroup invariants. We determine the Frobenius number for numerical semigroups generated by Pythagorean triplets.

In the second chapter, we deal with the problem of invariance of the Frobenius number under deletion of one or more elements from the generating set. We solve the problem for modified arithmetic progressions and compound sequences.

In the third chapter we deal with unique factorization of numerical semigroups generated by compound sequences.

In the fourth chapter, we study fundamental gaps and determine the set of fundamental gaps for numerical semigroups generated with embedding dimension 2 and for some numerical semigroups with embedding dimension 3, as well as the numerical semigroups generated by arithmetic progressions. We introduce generalized fundamental gaps and close the chapter by calculating the generalized fundamental gaps of order λ for a numerical semigroup with embedding dimension 2.

In the fifth and final chapter we study the inverse problem for proportionally modular numerical semigroups. The two sections of this chapter deal with the inverse problem for numerical semigroups generated by arithmetic progressions and for numerical semigroups with embedding dimension 3.