Abstract

The thesis deals with subsemigroups of \((\mathbb{N}_0^m, +)\), a special discussion is later devoted to the cases \(m = 1\), \(m = 2\) and \(m = 3\). We prove that a subsemigroup of \(\mathbb{N}_0^m\) is finitely generated if and only if its generated cone is finitely generated (equivalently polyhedral) and we describe basic topological properties of such cones. We give a few examples illustrating that conditions sufficient for finite generation in \(\mathbb{N}_0^2\) can not be easily transferred to higher dimensions. We define the Hilbert basis and the related notion of Carathéodory’s rank. Besides their basic properties we prove that Carathéodory’s rank of a subsemigroup of \(\mathbb{N}_0^m\), \(m = 1, 2, 3\), is less than or equal to \(m\). A particular attention is devoted to the subsemigroups containing non-trivial subsemigroups of “subtractive” elements.