Nonsimple collections of cells whose polyomino ideals are prime

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Abstract. For a polyomino or a collection of cells, to determine the primality of their polyomino ideals is an important topic in combinatorial commutative algebra. Since it is proved that all simple polyominoes are prime, researches in this topic focus on nonsimple polyominoes recently. In this talk, we introduce some recent works about this topic, and introduce a new method called zero-sum condition. Based on this method, we construct a class of prime polyominoes, each of which contains a good rectangle piece, and we give a class of prime collections of cells called extended bipartite collections of cells. These two classes of collections of cells almost include all the known prime polyominoes.