Oscillations of arithmetical functions defined by factorization-related properties

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We show some results on oscillations of the counting functions of subsets of arithmetical semigroups defined by factorial properties. The main problem in showing the existence of oscillations is to show the existence of an appropriate singularity of the related zeta function. To do that, one needs to know at least the general shape of the zeta function. However, there are important examples of semigroup subsets (outside of the class of sets called Ω sets by the author), for which this may be a difficult task. We will show some general results related to Ω sets and attempt to tackle some subsets outside of this class.