

# Lower bounds for $\epsilon$ -saturation time of star graphs

Andrei Eliseev

This work focuses on a study of a dynamic process on metric graphs that can be described as follows. At the initial moment a single point is placed at some vertex of the graph that then starts travelling through it in continuous time with unit velocity. Each time when any moving point lies at a vertex (including the initial moment) it spreads over all adjacent edges, thus bearing new travelling points. Eventually, after some time these points may form  $\epsilon$ -nets on all edges of the graph for some positive  $\epsilon$ . In this case, the graph is said to become “ $\epsilon$ -saturated”. The goal of this research is to estimate the moments in time when  $\epsilon$ -saturation occurs (i.e., the “ $\epsilon$ -saturation moments”) for any metric graph with the following properties: (1) the graph is a star graph; (2) the lengths of all its edges are linearly independent over rational numbers. The main results of this work with respect to the aforementioned set of graphs are: (1) the existence of  $\epsilon$ -saturation moments has been proven; (2) lower bounds of the first  $\epsilon$ -saturation moment have been presented; (3) lower asymptotic bound for the first  $\epsilon$ -saturation moment has been deduced.