

# Genetic Algorithm and Geometric Constructions

Sirazitdinova, Zarema (School: Specialized High School #165)

In our project, we create a virtual GeoMir, the inhabitants of which are polyhedrons, as well as virtual organisms, which we called  $\gamma$ -rodents.  $\gamma$ -rodents are able to build straight lines, as well as find the intersection points of new lines with already built (if any) with already built. All constructions of  $\gamma$ -rodents are performed in exact accordance with the commands recorded in their genetic code. For mathematical calculations, we chose barycentric coordinates in space with respect to four given points, deliberately avoiding Cartesian coordinates, because we want to put the computer in the position of a student who solves the stereometric problem of construction using a flat drawing (a projective image of a stereometric structure on a plane). Since the projective transformation preserves the ratio of segments lying on one or parallel lines, then the barycentric coordinates of the points of space during this transformation with respect to the four given points are saved. The aim of the project is to study the possibility of using a genetic algorithm in solving geometric problems, as well as the development of a computer application that implements this algorithm.