Task:

The following graph theoretic problem models robot navigation and safe communication. Given a graph (network), we want to find the largest number of vertices where robots or other objects can be placed such that there is an unobstructed shortest path between any two robots. For other tasks (e.g., designing a secure communication network), we require the existence of an unobstructed shortest path between any two vertices.

Possible solutions:

In our recent publications, we presented optimal solutions to the above problems in the class of Hamming graphs, Kneser graphs, and Johnson graphs.