

Path finding of indoor mobile robot using harmonic potentials via explicit decoupled group modified accelerated over relaxation method

ABSTRACT

The harmonic potential fields, a solution to the equation of Laplace are widely used in robot pathfinding as a suggestion for robot course-plotting in an identified environment. The computation of these harmonic functions often involves simulations on a high-performance computer. In the pursuit to solve the problem of robot navigation, this article suggests a technique called Half-Sweep Block Modified Accelerated Over-Relaxation or better known as Explicit Decoupled Group Modified Accelerated Over-Relaxation (EDGMAOR). To verify the effectiveness of EDGMAOR, simulations of robot navigation were applied in a static known enclosed environment. Experiments are provided to assess the performance of the suggested technique. In particular, different starting and goal positions are used to assess the paths generated from the simulations. The outcomes show the advantages of the proposed algorithm. In the end, the research indicates that the proposed method in computing harmonic functions is appealing and attainable for solving path planning problems.