

RYERSON UNIVERSITY
DEPARTMENT OF MATHEMATICS
GRAPHS AT RYERSON (G@R) SEMINAR

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Location: ENG 210

Search on a Line by Byzantine Robots

Abstract:

We consider the problem of fault-tolerant parallel search on an infinite line by n robots. Starting from the origin, the robots are required to find a target at an unknown location. The robots can move with maximum speed 1 and can communicate wirelessly among themselves. However, among the n robots, there are f robots that exhibit *byzantine faults*. A faulty robot can fail to report the target even after reaching it, or it can make malicious claims about having found the target when in fact it has not. Given the presence of such faulty robots, the search for the target can only be concluded when the non-faulty robots have sufficient verification that the target has been found. We aim to design algorithms that minimize the value of $S_d(n, f)$, the time to find a target at a distance d from the origin by n robots among which f are faulty. We give several different algorithms whose running time depends on the ratio f/n , the density of faulty robots, and also prove lower bounds. Our algorithms are optimal for some densities of faulty robots.

ALL FACULTY, STAFF, STUDENTS AND GUESTS ARE WELCOME TO ATTEND