

Robustly Hosting Applications

Ananya Christman, Davin Chia*, Middlebury College

Our enquiry is motivated by a common industry problem of trying to minimize server disruptions - If a server crashes, is it possible to have zero service disruption? And if so, how? This happens when servers host multiple applications and an issue in one application crashes the hosting server, halting all other applications on that server. Our goal is to find the maximum number of robustly hosted applications given n number of servers. We show that this problem of robust hosting can be reduced to an antichain in combinatorics and solved with Sperner's Theorem. We also explore the reverse relation - the minimum number of servers needed to robustly host n applications, and utilize Sitrling's approximation to provide a $O(\log n)$ approximation algorithm to calculate its value.