מכון ויצמן למדע

THE WEIZMANN INSTITUTE OF SCIENCE

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Computer Science Seminar

,The Wolfson Auditorium Building
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WOLFSON AUDITORIUM

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C-single crossing Interdependent valuations

Abstract:

We consider the goal of social welfare maximization where a single item is to be assigned to one of to n potential agents with interdependent values.

That is, each agent has her own private signal, and the valuation of each agent is a known function of all n private signals. This captures settings such as valuations for artwork, oil drilling rights, broadcast rights, and many more. In the interdependent value setting, all previous work has assumed a so-called single-crossing condition. Single-crossing means that the impact of agent iâ□□s private signal, s_i, on her own valuation is greater than the impact of s_ii on the valuation of any other agent. It is known that without the single-crossing condition an efficient outcome cannot be obtained. We study welfare maximization for interdependent valuations through the lens of approximation.

We show that, in general, without the single-crossing condition, one cannot hope to approximate the optimal social welfare any better than the approximation given by assigning the item to a random bidder. Consequently, we introduce a relaxed version of single-crossing, c-single-crossing, parameterized by c â□¥ 1, which means that the impact of s_i on the valuation of agent i is at least 1/c times the impact of s_i on the valuation of any other agent (c = 1 is single-crossing). Using this parameterized notion, we obtain a host of positive results. We also consider interdependent settings when valuations are concave and give improved results.

Joint work with Alon Eden, Michal Feldman, and Kira Goldner.