abstract

COMPUTER SCIENCE/DISCRETE MATH I
Topic:

Speaker:

Affiliation:

Date:

Time/Room:

In the late nineties Erickson proved a remarkable lower bound on the decision tree complexity of one of the central problems of computational geometry: given n numbers, do any r of them add up to 0? His lower bound of $\Omega(n^{\lceil r/2\rceil})$, for any fixed r, is optimal if the polynomials at the nodes are linear and at most r-variate. We generalize his bound to s-variate polynomials for $s>r$. Erickson's bound decays quickly as r grows and never reaches above pseudo-polynomial: we provide an exponential improvement.

Our arguments are based on three ideas:

(i) a geometrization of Erickson's proof technique;
(ii) the use of error-correcting codes; and
(iii) a tensor product construction for permutation matrices.