

September 2013

MADALGO seminar by Seth Pettie, Aarhus University

Sharp Bounds on Davenport-Schinzel Sequences of Every Order

Abstract:

A Davenport-Schinzel with order s is a sequence over an n letter alphabet that avoids subsequences of the form $a..b..a..b..$ with lengths $\leq s+2$. They were originally used to bound the complexity of the lower envelope of degree- s polynomials or any class of functions that cross at most s times. They have numerous applications in computational geometry.

Let $DS_s(n)$ be the maximum length of such a sequence. In this talk I'll present a new method for obtaining sharp bounds on $DS_s(n)$ for every order s . This work reveals the unexpected fact that sequences with odd order s behave essentially like even order $s-1$. The results refute both common sense and a conjecture of Alon, Kaplan, Nivasch, Sharir, and Smorodinsky [2008]. Prior to this work, tight upper and lower bounds were only known for s up to 3 and all even $s > 3$.

A manuscript is available at arXiv:1204.1086 <<http://arxiv.org/pdf/1204.1086v2.pdf>>. An extended abstract appeared in the Symposium on Computational Geometry.

Host: Gerth Stølting Brodal