

An incidence bound and its applications

Anurag Bishnoi

Ghent University, Belgium

<https://anuragbishnoi.wordpress.com/>

Abstract

We will discuss a bound, originally due to Haemers [1] and recently rediscovered by Lund-Saraf [2], on the number of incidences between points and blocks in a combinatorial design. This bound can either be proved via methods from spectral graph theory (like interlacing eigenvalues), or via the so-called “variance trick”. We will see how it gives us a new proof of the classical Bruen-Thas upper bound on minimal blocking sets in finite projective planes. Other applications and historical motivation(s) for this bound will also be discussed.

References.

- [1] W. H. Haemers, Interlacing eigenvalues and graphs. *Linear Algebra Appl.* 226 (1995), 593–616.
- [2] B. Lund and S. Saraf, Incidence bounds for block designs. *SIAM J. Discrete Math.* 30 (2016), 1997–2010.