

Duality for asymptotic invariants

Alexandra Seceleanu

We propose a notion of duality for numerical sequences. In general, this duality pairs a sub-additive sequence to a super-additive sequence and yields a reciprocity relation between the asymptotic growth factors of the two sequences.

This has applications to commutative algebra. Specifically, given a family of ideals $\mathcal{I} = \{I_n\}_{n \in \mathbb{N}}$ and a function f that attaches to every ideal a numerical invariant (for example, the initial degree of Castelnuovo-Mumford regularity) one often considers the asymptotic invariant $\hat{f}(\mathcal{I}) = \lim_{n \rightarrow \infty} \frac{f(I_n)}{n}$. Using the above-mentioned duality, we establish relationships between pairs of such asymptotic invariants.

This is joint work with Michael DiPasquale and Thái Nguyễn.