Leavitt path algebras and Cayley graphs

Cristobal Gil Canto
Universidad de Malaga

Leavitt path algebras are natural generalizations of algebras associated to graphs. Among many other interesting properties, they include the algebras without the Invariant Basis Number (IBN) property originally introduced by W. G. Leavitt. On the other hand, Leavitt path algebras are the algebraic version of Cuntz-Krieger graph C^*-algebras. We begin by giving some of the early, fundamental results in the subject.

Let n be a positive integer and for each $0 \leq j \leq n-1$ we let C_n^j denote Cayley graph for the cyclic group $\mathbb{Z}_n$ with respect to the subset $\{1, j\}$. Utilizing the Smith Normal Form process, it is possible to analyze the Grothendieck group of the Leavitt path algebras $L_K(C_n^j)$ for any field K in order to explicitly realize them as the Leavitt path algebras of graphs having at most $j+1$ vertices. The case $j = 2$ has some surprising connection to the classical Fibonacci sequence. In case $j = 3$, it is related to a "Fibonacci-like" sequence, called Narayana's cow sequence.