IDEALS IN LEAVITT PATH ALGEBRAS

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Starting from a directed graph and a field k, it is possible to construct an associative algebra over k that reflects the information contained the graph: its *Leavitt path algebras.* This algebra is in some sense generated by all the possible paths in the graph, together with their inverses. More precisely, if E_0 denotes the set of vertices of E, E_1 the set of edges, and $(E_1)^*$ a set of new symbols e^* for every edge $e \in E_1$, $LK(E)$ is defined as a free associative k-algebra generated by $E_0 \cup E_1 \cup (E_1)^*$,subject to certain five axioms.

The first three axioms encode natural rules stemming from the path multiplication, while the last two are more involved and are motivated by connections with a related construction in functional analysis.

Examples of Leavitt path algebras are the algebras of Laurent polynomials and matrix algebras.

Leavitt path algebras are naturally graded over the integers. This grading, together with graph theoretic methods, can be used to understand the ideal structure of these objects, and to prove uniqueness theorems for these algebras.

Our main reference will be the first two chapters of the recent book [1].

Prerequisites: algebra, linear algebra, combinatorics, complex analysis.

References

[1] G. Abrams, P. Ara and M. Siles Molina, *Leavitt path algebras*, Lecture Notes in Mathematics, 2191, Springer, London, 2017.

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