Publ. Mat. **60** (2016), 235–263
DOI: 10.5565/PUBLMAT_60116_09

EXTREME CYCLES. THE CENTER OF A LEAVITT PATH ALGEBRA

María G. Corrales García, Dolores Martín Barquero, Cándido Martín González, Mercedes Siles Molina, and José F. Solanilla Hernández

Abstract: In this paper we introduce new techniques in order to deepen into the structure of a Leavitt path algebra with the aim of giving a description of the center. Extreme cycles appear for the first time; they concentrate the purely infinite part of a Leavitt path algebra and, jointly with the line points and vertices in cycles without exits, are the key ingredients in order to determine the center of a Leavitt path algebra. Our work will rely on our previous approach to the center of a prime Leavitt path algebra [**13**]. We will go further into the structure itself of the Leavitt path algebra. For example, the ideal $I(P_{ec} \cup P_c \cup P_l)$ generated by vertices in extreme cycles (P_{ec}), by vertices in cycles without exits (P_c), and by line points (P_l) will be a dense ideal in some cases, for instance in the finite one or, more generally, if every vertex connects to $P_l \cup P_c \cup P_{ec}$. Hence its structure will contain much of the information about the Leavitt path algebra. In the row-finite case, we will need to add a new hereditary set: the set of vertices whose tree has infinite bifurcations (P_{b^∞}).

2010 Mathematics Subject Classification: Primary: 16D70.

Key words: Leavitt path algebra, center, socle, extreme cycle, cycle, line point.