

ON GROUPOID ALGEBRAS WITH APPLICATIONS TO LEAVITT LABELLED PATH ALGEBRAS

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Often an algebra is built from some underlying object such that properties of the underlying object are reflected in the structure of the algebra. For example, some combinatorial properties of graphs determine certain algebraic properties of Leavitt path algebras and similarly the for a partial dynamical system and its associated partial skew-group ring. Groupoids form a unifying framework for such algebras and provide us with another toolkit to study them.

In the first part of this mini-course, we will introduce basic definitions on ample groupoids and Steinberg algebras associated with them. With a view toward labelled graphs, we will explore how Leavitt path algebras and partial skew-group rings can be realised as Steinberg algebras. We will present select results that are fundamental in the study of such algebras.

In the second part of the mini-course, we will introduce labelled graphs and labelled spaces as well as Leavitt labelled path algebras. This class of algebras generalises both the usual Leavitt path algebras as well as a large class of commutative algebras generated by idempotents. We will give some conditions on partial actions so that their skew-group rings can be realised as Leavitt labelled path algebras.