THE FIELDS INSTITUTE
FOR RESEARCH IN MATHEMATICAL SCIENCES

ABSTRACTS 1.2

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*Continued fractions, tilting modules and the construction of large indecomposable modules*

The aim of the lecture is to present further insight into the representation theory of some tubular algebras. It is well-known that most of the finite dimensional indecomposable modules of a tubular algebra belong to tubes: there is a preprojective component and a preinjective component, the remaining indecomposable modules belong to tubular families, any of these families of tubes is indexed by the projective line over the base field, and the set of these tubular families is indexed by $\mathbb{Q}_0^\infty$ (the set of non-negative rational numbers completed by a symbol $\infty$). The tubular algebras to be considered are those with precisely three simple modules (in order to construct such an algebra one needs a primitive field extension of degree 4). We will show that the continued fraction expansion of any positive real number which is not rational can be used in order to construct a large set of infinite dimensional representations and we expect that in this way one will obtain many indecomposable algebraically compact modules. The structure of these new modules is quite surprizing.

The results are based on a detailled investigation of all the tilting modules and their relationship to Farey pairs and Farey triples. The Grothendieck group yields a nice playing ground for dealing with concepts from plane geometry and elementary number theory.