

## **$C^*$ -ALGEBRAS OF HIGHER-RANK GRAPHS FROM GROUPS ACTING ON BUILDINGS, AND EXPLICIT COMPUTATION OF THEIR K-THEORY**

SAM A. MUTTER, AURA-CRISTIANA RADU, AND ALINA VDOVINA

**Abstract:** We unite elements of category theory, K-theory, and geometric group theory, by defining a class of groups called  $k$ -cube groups, which act freely and transitively on the product of  $k$  trees, for arbitrary  $k$ . The quotient of this action on the product of trees defines a  $k$ -dimensional cube complex, which induces a higher-rank graph. We make deductions about the K-theory of the corresponding rank- $k$  graph  $C^*$ -algebras, and give examples of  $k$ -cube groups and their K-theory. These are among the first explicit computations of K-theory for an infinite family of rank- $k$  graphs for  $k \geq 3$ , which is not a direct consequence of the Künneth theorem for tensor products.

**2020 Mathematics Subject Classification:** 19M05.

**Key words:** higher-rank graphs, graph algebras, K-theory, buildings.