



Centro de Matemática  
Universidade do Porto

## Seminar on Semigroups, Automata and Languages

On the Dowling and Rhodes lattices and wreath products.

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**Abstract:** Dowling and Rhodes defined different lattices on the set of triples (Subset, Partition, Cross Section) over a fixed finite group  $G$ . Although the Rhodes lattice is not a geometric lattice, it defines a matroid in the sense of the theory of Boolean representable simplicial complexes. This turns out to be the direct sum of a complete matroid with a lift matroid of the complete biased graph over  $G$ . As is well known, the Dowling lattice defines the frame matroid over a similar biased graph. This gives a new perspective on both matroids and also an application of matroid theory to the theory of finite semigroups. We also make progress on an important question for these classical matroids: what are the minimal Boolean representations and the minimum degree of a Boolean matrix representation? This is joint work with Stuart Margolis (Bar Ilan University, Israel) and John Rhodes (University of California at Berkeley, USA).

**Date:** Friday, 19 January 2018, 14:30  
**Place:** Room FC1 030, DMat-FCUP



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