

# A new perspective on cocyclic development

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(Joint work with Santiago Barrera Acevedo, Heiko Dietrich and Ronan Egan)

## Abstract

The theory of cocyclic development was developed by de Launey, Flannery and Horadam in the 1990s, and found a spiritual home in Seville in the 2000s. In this talk, I will report on recent work with Santiago Barrera Acevedo, Heiko Dietrich and Ronan Egan on the centraliser algebras of monomial representations. Group development and cocyclic development occur as special cases of this framework, corresponding to regular permutation groups and their central extensions. Our framework allows us to work with arbitrary monomial groups however.

One of the bottlenecks in the construction of cocyclic Hadamard matrices is that the space of 2-cocycles grows exponentially with the size of the indexing group. In contrast, I will show that searching for real or complex Hadamard matrices in the centraliser algebra of a monomial representation of bounded rank is tractable (if not always very practical).

This work is dedicated to Prof Dane Flannery, on the occasion of his 60th birthday.

## References

- [1] Santiago Barrera Acevedo, Padraig Ó Catháin, Heiko Dietrich and Ronan Egan. Centralisers of monomial representations and applications in combinatorics. *Algebraic Combinatorics, to appear*.