

# Rational representations of flowers

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## Abstract

A *flower* is an embedding of the wheel graph in the Euclidean plane as a coin graph. In a given flower with  $n$  petals, the radii of the petals satisfy an algebraic equation, that we show is equivalent to a polynomial equation  $P_n = 0$  where  $P_n \in \mathbb{Q}[x_1, \dots, x_n]$  is irreducible. We will explore the properties of these polynomials and what they can tell us about the underlying graphs. In particular one might ask: when can we realize these flowers, using all rational radii? The case where the number of petals of the flower is  $n = 3$  has a nice solution. In the case where  $n \geq 4$  only partial answers are known.

**Keywords:** coin graph, wheel graph.