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Some cogrowth problems

The cogrowth series of a finite presentation is the generating function of all words in the generators that are equivalent to the identity. A result of Kouksov tells us that the cogrowth series is rational if and only the group is finite. In light of that it is natural to ask "When is the cogrowth series algebraic?" It is conjectured that the cogrowth series is algebraic if and only if the group is virtually-free.

We give three infinite families of group presentations having non-algebraic cogrowth series. These groups are close to but not virtually-free and so support this conjecture.