HADAMARD QUOTIENT THEOREM FOR GENERALISED POLYNOMIALS

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While the sum and the product of two linear recurrent sequences are linear recurrent, this is usually not the case for the quotient. This is because the values of any linear recurrent sequence lie in a finitely generated ring, and this property is usually not preserved by taking the quotient. The celebrated Hadamard quotient theorem states that this 'finiteness' requirement is the only reason why the quotient of two linear recurrent sequences might fail to be linear recurrent.

In the talk, we will formulate a variant of the Hadamard quotient theorem for generalised polynomials, that is, functions that can be expressed using standard algebraic operations and the floor function. Generalised polynomials have long been studied in both number theory and dynamics and are intimately related to dynamics on nilmanifolds. We will show how dynamical and ergodic-theoretic methods can be used to obtain arithmetical information concerning the behaviour of the quotients of two generalised polynomials and prove an analogue of the Hadamard quotient theorem. We will also pose several open problems.

The talk is based on joint work with Jakub Konieczny (Oxford).

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Date: April 27, 2024.