# Matrix product and sum rule for Macdonald polynomials

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## Abstract

We present a new, explicit sum formula for symmetric Macdonald polynomials $P\lambda$ and show that they can be written as a trace over a product of (infinite dimensional) matrices. These matrices satisfy the Zamolodchikov– Faddeev (ZF) algebra. We construct solutions of the ZF algebra from a rank-reduced version of the Yang–Baxter algebra. As a corollary, we find that the normalization of the stationary measure of the multi-species asymmetric exclusion process is a Macdonald polynomial with all variables set equal to one.

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