

Some results on permutations of matrix products

HANS JOACHIM WERNER

Institute for Financial Economics and Statistics

University of Bonn (Germany)

`h.j.w.de@uni-bonn.de`

It is well-known that $\text{trace}(AB) \geq 0$ for real-symmetric nonnegative definite matrices A and B . However, $\text{trace}(ABC)$ can be positive, zero or negative, even when C is real-symmetric nonnegative definite. The genesis of the present investigation is consideration of a product $A = A_1 A_2 \cdots A_n$ of square matrices. Permuting the factors of A leads to a different matrix product. We are interested in conditions under which the spectrum remains invariant. The main results are for square matrices over an arbitrary algebraically closed commutative field. The special case of real-symmetric, possibly nonnegative definite, matrices is also considered.

This is a joint work with I. OLKIN (Stanford University).