

## Patterned matrices with explicit trace vector and some consequences

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Let  $A$  be an  $n \times n$  complex matrix. R. Pereira has proved that there is an  $n$ -vector  $v$  such that  $v^* p(A)v = \text{trace}(p(A)/n)$ , for all polynomials  $p(A)$ , and he calls such a vector  $v$  a trace vector for  $A$ . While finding a trace vector for an arbitrary  $A$  is difficult, there are many classes of matrices for which a trace vector is easily found. We present several examples of this and its consequences. In particular, a patterned matrix playing a type of universal role in the nonnegative inverse eigenvalue problem has this property, and we deduce new results on the sign patterns of the coefficients of related power series.

This is a joint work with R. LOEWY (Technion) and H. ŠMIGOC (University College Dublin).