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Faster stochastic trace estimation with a Chebyshev product identity.  
(English)  
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Summary: Methods for stochastic trace estimation often require the repeated evaluation of expressions of the form $z^T p_n(A)z$, where $A$ is a symmetric matrix and $p_n$ is a degree $n$ polynomial written in the standard or Chebyshev basis. We show how to evaluate these expressions using only $\lceil n/2 \rceil$ matrix-vector products, thus substantially reducing the cost of existing trace estimation algorithms that use Chebyshev interpolation or Taylor series.

MSC:  
65-XX Numerical analysis  
62-XX Statistics

Keywords:  
stochastic trace estimation; Chebyshev polynomials; spectral function; Hutchinson’s method

Full Text: DOI

References:


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