A Million-Dollar Matrix

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Abstract

The Redheffer matrix has been included in the MATLAB Gallery for many years, but, until now, I didn't know much about it. The Riemann Hypothesis is subject of one of the Clay Mathematics Institute Millenium Prizes that are worth one million dollars each.

If we could find an n-by-n Redheffer matrix

R = gallery(`redheff',n)

with a determinant that satisfies

det(R) > sqrt(n)

it would be worth a million dollars.

For over 100 years, mathematicians believed that such an **n** might exist. This is the story of Redheffer matrices, the Mertens conjecture, five different ways to compute **n**, and the proof that a prize-winning matrix does not exist.

https://blogs.mathworks.com/cleve/2024/10/22/mobius-mertens-and-redheffer