replace the diagonal elements of $\mathbf{A}+\mathbf{A}^*$, yielding a zero-trace Hermitian Gaussian matrix. Only one instance of the real matrix **Q** is required for each dimension *D*.

Instead of using the Gram-Schmidt process, for certain values of *D*, Hadamard matrices can be employed [62, ch. 7]. Hadamard matrices are orthogonal matrices with all matrix elements equal to ± 1, and typically with a first column comprising all ones. In these cases, the real matrix **Q** may be obtained by deleting the first column of a Hadamard matrix.

The eigenvalues of a tri-diagonal random matrix can be the same as those of a Gaussian unitary ensemble [61]. Using a procedure similar to that described above, a tri-diagonal matrix may be modified to have zero trace. The eigenvalues of a tri-diagonal matrix can be found with far fewer operations than those of a fully populated matrix [60, Sec. 8.5].

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