## Description

issymmetric($A$) returns 1 if $A{=}{=}A'$ and returns 0 otherwise.  (Also see mreldifsym() in
[M-5] **reldif( )**.)

issymmetriconly($A$) returns 1 if $A{=}{=}$transposeonly($A$) and returns 0 otherwise.

## Syntax

> *real scalar*  issymmetric(*transmorphic matrix A*)

> *real scalar*  issymmetriconly(*transmorphic matrix A*)

## Remarks and examples

issymmetric($A$) and issymmetriconly($A$) return the same result except when $A$ is complex.

In the complex case, issymmetric($A$) returns 1 if $A$ is equal to its conjugate transpose, that is, if $A$ is
Hermitian, which is the complex analog of symmetric. $A$ is symmetric (Hermitian) if its off-diagonal
elements are conjugates of each other and its diagonal elements are real.

issymmetriconly($A$), on the other hand, uses the mechanical definition of symmetry: $A$ is
symmetriconly [*sic*] if its off-diagonal elements are equal. issymmetriconly() is uninteresting, math-
ematically speaking, but can be useful in certain data management programming situations.

## Conformability

issymmetric($A$), issymmetriconly($A$):
$\quad\quad\quad\quad A$:     $r \times c$
$\quad\quad result$:     $1 \times 1$

## Diagnostics

issymmetric($A$) returns 0 if $A$ is not square. If $A$ is $0 \times 0$, it is symmetric.

issymmetriconly($A$) returns 0 if $A$ is not square. If $A$ is $0 \times 0$, it is symmetriconly.

Charles Hermite (1822–1901) was born in Dieuze in eastern France and early showed an aptitude for mathematics, publishing two papers before entering university. He started studying at the Ecole Polytechnique but left after 1 year because of difficulties from a defect in his right foot. However, Hermite was soon appointed to a post at the same institution and later at the Sorbonne. He made outstanding contributions to number theory, algebra, and especially analysis, and he published the first proof that $e$ is transcendental. Hermite's name carries on in Hermite polynomials, Hermite's differential equation, Hermite's formula of interpolation, and Hermitian matrices.

## Reference

James, I. M. 2002. *Remarkable Mathematicians: From Euler to von Neumann*. Cambridge: Cambridge University Press.

## Also see

[M-5] **makesymmetric( )** — Make square matrix symmetric (Hermitian)

[M-5] **reldif( )** — Relative/absolute difference

[M-4] **Utility** — Matrix utility functions