

**NAME**

DSTEV - compute all eigenvalues and, optionally, eigenvectors of a real symmetric tridiagonal matrix A

**SYNOPSIS**

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SUBROUTINE DSTEV(
    CHARACTER
        JOBZ, N, D, E, Z, LDZ, WORK, INFO )
    CHARACTER
        JOBZ
    INTEGER INFO, LDZ, N
    DOUBLE PRECISION D( * ), E( * ), WORK( * ), Z( LDZ, * )

```

**PURPOSE**

DSTEV computes all eigenvalues and, optionally, eigenvectors of a real symmetric tridiagonal matrix A.

**ARGUMENTS**

**JOBZ** (input) CHARACTER\*1  
 = 'N': Compute eigenvalues only;  
 = 'V': Compute eigenvalues and eigenvectors.

**N** (input) INTEGER  
 The order of the matrix.  $N \geq 0$ .

**D** (input/output) DOUBLE PRECISION array, dimension (N)  
 On entry, the n diagonal elements of the tridiagonal matrix A. On exit, if INFO = 0, the eigenvalues in ascending order.

**E** (input/output) DOUBLE PRECISION array, dimension (N)  
 On entry, the (n-1) subdiagonal elements of the tridiagonal matrix A, stored in elements 1 to N-1 of E; E(N) need not be set, but is used by the routine. On exit, the contents of E are destroyed.

**Z** (output) DOUBLE PRECISION array, dimension (LDZ, N)  
 If JOBZ = 'V', then if INFO = 0, Z contains the orthonormal eigenvectors of the matrix A, with the i-th column of Z holding the eigenvector associated with D(i). If JOBZ = 'N', then Z is not referenced.

**LDZ** (input) INTEGER  
 The leading dimension of the array Z.  $LDZ \geq 1$ , and if JOBZ = 'V',  $LDZ \geq \max(1, N)$ .

**WORK** (workspace) DOUBLE PRECISION array, dimension (max(1, 2\*N-2))  
 If JOBZ = 'N', WORK is not referenced.

**INFO** (output) INTEGER  
 = 0: successful exit  
 < 0: if INFO = -i, the i-th argument had an illegal value  
 > 0: if INFO = i, the algorithm failed to converge; i off-diagonal elements of E did not converge to zero.