

ctpttf.f(3)

LAPACK

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**NAME**

ctpttf.f –

**SYNOPSIS****Functions/Subroutines**subroutine **ctpttf** (TRANSR, UPLO, N, AP, ARF, INFO)*CTPTTF copies a triangular matrix from the standard packed format (TP) to the rectangular full packed format (TF).***Function/Subroutine Documentation**subroutine **ctpttf** (character**TRANSR**, character**UPLO**, integer**N**, complex, dimension( 0: \* )**AP**, complex, dimension( 0: \* )**ARF**, integer**INFO**)**CTPTTF** copies a triangular matrix from the standard packed format (TP) to the rectangular full packed format (TF).**Purpose:**

CTPTTF copies a triangular matrix A from standard packed format (TP) to rectangular full packed format (TF).

**Parameters:***TRANSR*

TRANSR is CHARACTER\*1

= 'N': ARF in Normal format is wanted;

= 'C': ARF in Conjugate-transpose format is wanted.

*UPLO*

UPLO is CHARACTER\*1

= 'U': A is upper triangular;

= 'L': A is lower triangular.

*N*

N is INTEGER

The order of the matrix A.  $N \geq 0$ .*AP*AP is COMPLEX array, dimension (  $N*(N+1)/2$  ),

On entry, the upper or lower triangular matrix A, packed columnwise in a linear array. The j-th column of A is stored in the array AP as follows:

if UPLO = 'U',  $AP(i + (j-1)*j/2) = A(i,j)$  for  $1 \leq i \leq j$ ;if UPLO = 'L',  $AP(i + (j-1)*(2n-j)/2) = A(i,j)$  for  $j \leq i \leq n$ .*ARF*ARF is COMPLEX array, dimension (  $N*(N+1)/2$  ),

On exit, the upper or lower triangular matrix A stored in RFP format. For a further discussion see Notes below.

*INFO*

INFO is INTEGER

= 0: successful exit

&lt; 0: if INFO = -i, the i-th argument had an illegal value

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**Further Details:**

We first consider Standard Packed Format when N is even.  
We give an example where  $N = 6$ .

AP is Upper	AP is Lower
00 01 02 03 04 05	00
11 12 13 14 15	10 11
22 23 24 25	20 21 22
33 34 35	30 31 32 33
44 45	40 41 42 43 44
55	50 51 52 53 54 55

Let  $\text{TRANSR} = 'N'$ . RFP holds AP as follows:

For  $\text{UPLO} = 'U'$  the upper trapezoid  $A(0:5,0:2)$  consists of the last three columns of AP upper. The lower triangle  $A(4:6,0:2)$  consists of conjugate-transpose of the first three columns of AP upper.

For  $\text{UPLO} = 'L'$  the lower trapezoid  $A(1:6,0:2)$  consists of the first three columns of AP lower. The upper triangle  $A(0:2,0:2)$  consists of conjugate-transpose of the last three columns of AP lower.

To denote conjugate we place -- above the element. This covers the case N even and  $\text{TRANSR} = 'N'$ .

RFP A	RFP A
	-- -- --
03 04 05	33 43 53
	-- --
13 14 15	00 44 54
	--
23 24 25	10 11 55
33 34 35	20 21 22
--	
00 44 45	30 31 32
-- --	
01 11 55	40 41 42
-- -- --	
02 12 22	50 51 52

Now let  $\text{TRANSR} = 'C'$ . RFP A in both UPLO cases is just the conjugate-transpose of RFP A above. One therefore gets:

RFP A	RFP A
-- -- -- --	-- -- -- -- --
03 13 23 33 00 01 02	33 00 10 20 30 40 50
-- -- -- --	-- -- -- -- --
04 14 24 34 44 11 12	43 44 11 21 31 41 51
-- -- -- -- --	-- -- -- --
05 15 25 35 45 55 22	53 54 55 22 32 42 52

We next consider Standard Packed Format when N is odd.  
We give an example where  $N = 5$ .



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AP is Upper	AP is Lower
00 01 02 03 04	00
11 12 13 14	10 11
22 23 24	20 21 22
33 34	30 31 32 33
44	40 41 42 43 44

Let  $\text{TRANSR} = 'N'$ . RFP holds AP as follows:

For  $\text{UPLO} = 'U'$  the upper trapezoid  $A(0:4,0:2)$  consists of the last three columns of AP upper. The lower triangle  $A(3:4,0:1)$  consists of conjugate-transpose of the first two columns of AP upper.

For  $\text{UPLO} = 'L'$  the lower trapezoid  $A(0:4,0:2)$  consists of the first three columns of AP lower. The upper triangle  $A(0:1,1:2)$  consists of conjugate-transpose of the last two columns of AP lower.

To denote conjugate we place -- above the element. This covers the case N odd and  $\text{TRANSR} = 'N'$ .

RFP A	RFP A
	-- --
02 03 04	00 33 43
	--
12 13 14	10 11 44
22 23 24	20 21 22
--	
00 33 34	30 31 32
-- --	
01 11 44	40 41 42

Now let  $\text{TRANSR} = 'C'$ . RFP A in both UPLO cases is just the conjugate-transpose of RFP A above. One therefore gets:

RFP A	RFP A
-- --	-- --
02 12 22 00 01	00 10 20 30 40 50
-- --	-- --
03 13 23 33 11	33 11 21 31 41 51
-- --	-- --
04 14 24 34 44	43 44 22 32 42 52

Definition at line 208 of file ctpttf.f.

## Author

Generated automatically by Doxygen for LAPACK from the source code.

