

- 3:** KB — INTEGER *Input*
On entry: k , the number of super-diagonals of the matrix B if UPLO = 'U', or the number of sub-diagonals if UPLO = 'L'.
Constraint: $KB \geq 0$.
- 4:** BB(LDBB,*) — *real* array *Input/Output*
Note: the second dimension of the array BB must be at least $\max(1, N)$.
On entry: the n by n symmetric positive-definite band matrix B , stored in rows 1 to $k + 1$. More precisely, if UPLO = 'U', the elements of the upper triangle of B within the band must be stored with element b_{ij} in $BB(k + 1 + i - j, j)$ for $\max(1, j - k) \leq i \leq j$; if UPLO = 'L', the elements of the lower triangle of B within the band must be stored with element b_{ij} in $BB(1 + i - j, j)$ for $j \leq i \leq \min(n, j + k)$.
On exit: B is overwritten by the elements of its split Cholesky factor S .
- 5:** LDBB — INTEGER *Input*
On entry: the first dimension of the array BB as declared in the (sub)program from which F08UFF (SPBSTF/DPBSTF) is called.
Constraint: $LDBB \geq KB + 1$.
- 6:** INFO — INTEGER *Output*
On exit: INFO = 0 unless the routine detects an error (see Section 6).

6 Error Indicators and Warnings

INFO < 0

If INFO = $-i$, the i th parameter had an illegal value. An explanatory message is output, and execution of the program is terminated.

INFO > 0

If INFO = i , the factorization could not be completed, because the updated element b_{ii} would be the square root of a negative number. Hence B is not positive-definite. This may indicate an error in forming the matrix B .

7 Accuracy

The computed factor S is the exact factor of a perturbed matrix $B + E$, where

$$|E| \leq c(k + 1)\varepsilon|S^T||S|,$$

$c(k + 1)$ is a modest linear function of $k + 1$, and ε is the *machine precision*. It follows that $|e_{ij}| \leq c(k + 1)\varepsilon\sqrt{(b_{ii}b_{jj})}$.

8 Further Comments

The total number of floating-point operations is approximately $n(k + 1)^2$, assuming $n \gg k$.

A call to this routine may be followed by a call to F08UEF (SSBGST/DSBGST) to solve the generalized eigenproblem $Az = \lambda Bz$, where A and B are banded and B is positive-definite.

The complex analogue of this routine is F08UTF (CPBSTF/ZPBSTF).

9 Example

See the example for F08UEF (SSBGST/DSBGST).