AX=B 线性方程组求解器

以propag.F为例：Line 1633 and Line 1655 (分别求解原始方程和统一的波动方程)

CALL SOLVE(UNK,MAT,RHS,TB,SLVPRO,INFOGR,MESH,TM1)

!| UNK |<->| BLOCK OF UNKNOWNS X

!| MAT |<--| BLOCK OF MATRICES A

!| RHS |<->| BLOCK OF PRIVATE BIEF\_OBJ STRUCTURES B

!| TB |<->| BLOCK WITH T1,T2,...

!| SLVPRO |-->| SOLVER STRUCTURE FOR PROPAGATION

!| INFOGR |-->| IF YES, INFORMATION ON GRADIENT

!| MESH |-->| MESH STRUCTURE

!| TM1 |<->| MATRIX

使用共轭梯度法时，需要的输入变量：UNK,MAT,RHS

! \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SUBROUTINE SOLVE (X, A, B,TB,CFG,INFOGR,MESH,AUX)

! \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

!~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

!| A |-->| MATRIX OF THE SYSTEM (OR BLOCK OF MATRICES)

!| AUX |-->| MATRIX FOR PRECONDITIONING.

!| B |-->| RIGHT-HAND SIDE OF THE SYSTEM

!| CFG |-->| STRUCTURE OF SOLVER CONFIGURATION

!| | | CFG%KRYLOV IS USED ONLY IF CFG%SLV = 7 (GMRES)

!| INFOGR |-->| IF YES, PRINT A LOG.

!| MESH |-->| MESH STRUCTURE.

!| TB |-->| BLOCK OF VECTORS WITh AT LEAST

!| | | MAX(7,2+2\*CFG%KRYLOV)\*S VECTORS, S IS 1

!| | | IF A IS A MATRIX, 2 IF A BLOCK OF 4 MATRICES

!| | | AND 3 IF A BLOCK OF 9.

!| X |<->| INITIAL VALUE, THEN SOLUTION

TYPE(SLVCFG), INTENT(INOUT) :: CFG

!

! STRUCTURES OF VECTORS OR BLOCKS OF VECTORS

!

TYPE(BIEF\_OBJ), TARGET, INTENT(INOUT) :: X,B

TYPE(BIEF\_OBJ), INTENT(INOUT) :: TB

!

! STRUCTURES OF MATRIX OR BLOCK OF MATRICES

!

TYPE(BIEF\_OBJ), INTENT(INOUT) :: A, AUX

!

LOGICAL, INTENT(IN) :: INFOGR

!

! MESH STRUCTURE

!

TYPE(BIEF\_MESH), INTENT(INOUT) :: MESH

对角矩阵预处理：

CALL PRECDT(X,A,B,TBB%ADR(IT1)%P,MESH, CFG%PRECON,PREXSM,DIADON,S)

🡪 PRECD1(X, A, B, D%ADR(1)%P, MESH, PRECON, PREXSM, DIADON)

!

! CONJUGATE GRADIENT

!

CALL GRACJG(PX, A, PB, MESH,

& TBB%ADR(IT2)%P,TBB%ADR(IT3)%P,

& TBB%ADR(IT5)%P,TBB%ADR(IG)%P,

& CFG,INFOGR,AUX)

YSMP直接求解器不能并行计算，对GPU加速的求解器有启示。模仿来编程！

实参：

CALL SD\_SOLVE\_1(A%D%DIM1,MESH%NSEG,MESH%GLOSEG%I,

& MESH%GLOSEG%DIM1,

& A%D%R,A%X%R,X%R,B%R,INFOGR,A%TYPEXT)

形参：

(NPOIN,NSEGB,GLOSEG,MAXSEG,DA,XA,XINC,RHS,INFOGR,TYPEXT)

首先，需要将各子进程的A矩阵和B向量整合到主进程中，

TELEMAC2D模型中：

streamline.F 🡪 GLOB\_CHAR\_COMM() 🡪 P\_MPI\_ALLTOALL() 🡪 MPI\_ALLTOALL

SUBROUTINE P\_ALLGATHERV\_I （未使用）