
WORKSHOP PROBLEM 2

Reading and Adding Matrices

Objectives:

- Read and add matrices using SOL 100 and USERDMAP.

Procedure:

1. Read the following matrices using SOL 100 and USERDMAP.

$$K_1 = \begin{bmatrix} 1.0 & -1.0 \\ -1.0 & 1.0 \end{bmatrix} \quad K_2 = \begin{bmatrix} 1.0 & -1.0 \\ -1.0 & 1.0 \end{bmatrix}$$

2. Check if the matrices are read in properly.
3. Add K_1 and K_2 and print out the results.

Hints:

- Use DMI in the bulk data section and the DMIIN module to read in K_1 and K_2 .

Solution Input File:

soln2.dat

```
sol 100
compile userdmap
alter 2
dmiin dmi,dmindx/k1,k2,,,,,,,,/s,n,yes1/s,n,yes2 $
  if (yes1=true) then
    message //' k1 is read in '/yes1 $
    matprn k1// $
  else $
    message //' I cannot find k1'/yes1 $
  endif $
$
  if (yes2=true) then
    message //' k2 is read in'/yes2 $
    matprn k2// $
  else $
    message //' I cannot find k2'/yes2 $
  endif $
$
add k1,k2/k12 $
matprn k12// $
cend
begin bulk
dmi,k1,0,6,1,0,,2,2
dmi,k1,1,1,1.0,-1.0
dmi,k1,2,1,-1.0,1.0
dmi,k2,0,6,1,0,,2,2
dmi,k2,1,1,1.0,-1.0
dmi,k2,2,1,-1.0,1.0
enddata
```

Comparison of Results:

Compare the results obtained in the .f06 file with the results below:

```

^^^ K1 IS READ IN TRUE
1
...
0
0      MATRIX K1      (GINO NAME 101 ) IS A DB  PREC      2 COLUMN X      2 ROW
SYMMETRC MATRIX.
OCOLUMN      1      ROWS      1 THRU      2      -----
ROW
1)      1.0000D+00 -1.0000D+00
OCOLUMN      2      ROWS      1 THRU      2      -----
ROW
1)      -1.0000D+00  1.0000D+00
0THE NUMBER OF NON-ZERO TERMS IN THE DENSEST COLUMN =      2
0THE DENSITY OF THIS MATRIX IS 100.00 PERCENT.
^^^ K2 IS READ IN TRUE
1
...
0
0      MATRIX K2      (GINO NAME 101 ) IS A DB  PREC      2 COLUMN X      2 ROW
SYMMETRC MATRIX.
OCOLUMN      1      ROWS      1 THRU      2      -----
ROW
1)      1.0000D+00 -1.0000D+00
OCOLUMN      2      ROWS      1 THRU      2      -----
ROW
1)      -1.0000D+00  1.0000D+00
0THE NUMBER OF NON-ZERO TERMS IN THE DENSEST COLUMN =      2
0THE DENSITY OF THIS MATRIX IS 100.00 PERCENT.
1
...
0
0      MATRIX K12     (GINO NAME 101 ) IS A DB  PREC      2 COLUMN X      2 ROW
SYMMETRC MATRIX.
OCOLUMN      1      ROWS      1 THRU      2      -----
ROW
1)      2.0000D+00 -2.0000D+00
OCOLUMN      2      ROWS      1 THRU      2      -----
ROW
1)      -2.0000D+00  2.0000D+00
0THE NUMBER OF NON-ZERO TERMS IN THE DENSEST COLUMN =      2
0THE DENSITY OF THIS MATRIX IS 100.00 PERCENT.
1
* * * END OF JOB * * *

```