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                    CRATE - Clustering-based Nonlinear Analysis of Materials

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                              Release 1.0.0 (Jun 2023)

Problem under analysis: example_input_data_file

Input data file: example_input_data_file.dat

Starting program execution at: 17h22m00s (02/Mar/2023)
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--------------------------------------------------------------------------------
Start phase: Read input data file

  > Reading the input data file...

  > Reading discretization file...
```

$\vdots$

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--------------------------------------------------------------------------------
Start phase: Solve reduced microscale equilibrium problem

  Increment number:   1
  ===============================================================================
  Loading subpath:    1 |     Load factor | Total =  5.0e-03     Time | Total =  5.0e-03
        Increment:    1 |                 | Incr. =  5.0e-03          | Incr. =  5.0e-03


  Self-consistent scheme iteration:   0
  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
  Young modulus (E): 1.4505e+02  (norm. change: -)
  Poisson ratio (v): 2.8051e-01  (norm. change: -)


      Iteration                               Normalized residuals
   Number    Run time (s)              Equilibrium    Mac. strain    Mac. stress
  --------------------------------------------------------------------------------
     0       5.9795e-03                0.0000e+00     1.0000e+00     0.0000e+00
     1       6.2778e-03                2.6344e-15     2.1684e-16     2.9407e-18
  --------------------------------------------------------------------------------

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  Iteration run time (s):  1.3539e-02


  ================================================================================
     Homogenized strain tensor (ε)               Homogenized stress tensor (σ)

   [  2.5000e-04  4.0852e-07  0.0000e+00  ]     [  3.9515e-02  5.7499e-20  0.0000e+00  ]
   [  4.0852e-07 -9.7988e-05  0.0000e+00  ]     [  5.7499e-20  8.3009e-20  0.0000e+00  ]
   [  0.0000e+00  0.0000e+00  0.0000e+00  ]     [  0.0000e+00  0.0000e+00  1.0275e-02  ]

  ================================================================================
  Increment run time (s):  1.3995e-02               Total run time (s):  8.7487e+00
```

$\vdots$

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--------------------------------------------------------------------------------
End phase: Solve reduced microscale equilibrium problem (phase duration time = 8.32e+00s)
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Ending program execution at: 17h23m07s (02/Mar/2023)

Problem analysed: example_input_data_file

Total execution time: 6.73e+01s (~0h1m)

Execution times:

   Phase                                      Duration (s)     %
   ----------------------------------------------------------------
   Read input data                             2.95e-01      0.44
   Compute cluster analysis data matrix        1.45e+00      2.16
   Perform RVE cluster analysis                3.33e+00      4.95
   Compute cluster interaction tensors         9.36e+00     13.91
   Solve reduced microscale equilibrium problem  8.32e+00   12.36
   Accumulated post-processing operations      4.45e+01     66.09
   ----------------------------------------------------------------


                            Program Completed
```