6.5 Example E: General Loading

Sample Input File for General Loading

Problem Summary

Load Type:	Thermo-Mechanical
Load History Data:	Combined: 33 - normal strain (transverse to fiber) 13 - shear strain 12 - shear strain 11, 22, and 23 component stress-free Heat-up from 23 ^{o}C to 223 ^{o} C
Load History:	Monotonic
Load Control:	Combined stress and strain
Load History Data:	$\dot{T} = 1.85$ ^{o}C/sec $\dot{\varepsilon}_{33} = 9.26x10^{-5}$/sec, $\varepsilon_{33max} = 0.01$, $\varepsilon_{33min} = 0$ $\dot{\varepsilon}_{13} = 5.56x10^{-5}$/sec, $\varepsilon_{13max} = 0.006$, $\varepsilon_{13min} = 0$ $\dot{\varepsilon}_{12} = 1.11x10^{-4}$/sec, $\varepsilon_{12max} = 0.012$, $\varepsilon_{12min} = 0$ $\Delta t = 0.4$ sec
Micromechanics Model:	Double Periodicity
Fiber Packing Arrangement:	Square Pack, R = 1., 45% fiber volume ratio
Repeating Unit Cell:	2x2 subcells, square pack using IDP=11
Integration Algorithm:	Forward Euler
Constituent Material Model:	Fiber: Elastic, isotropic Matrix: GVIPS - isotropic form
Constituents:	Fiber: SCS-6 (temp. dep. properties input manually) Matrix: TIMETAL21S

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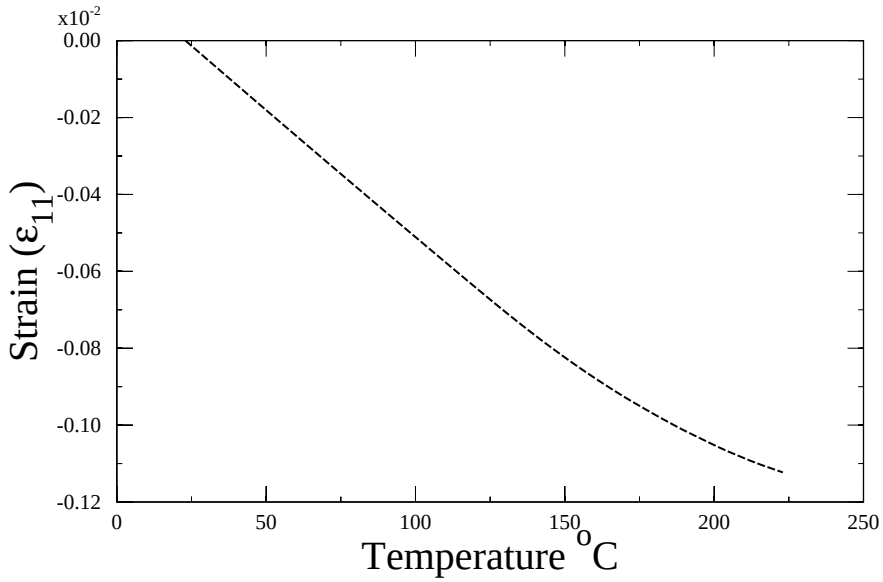
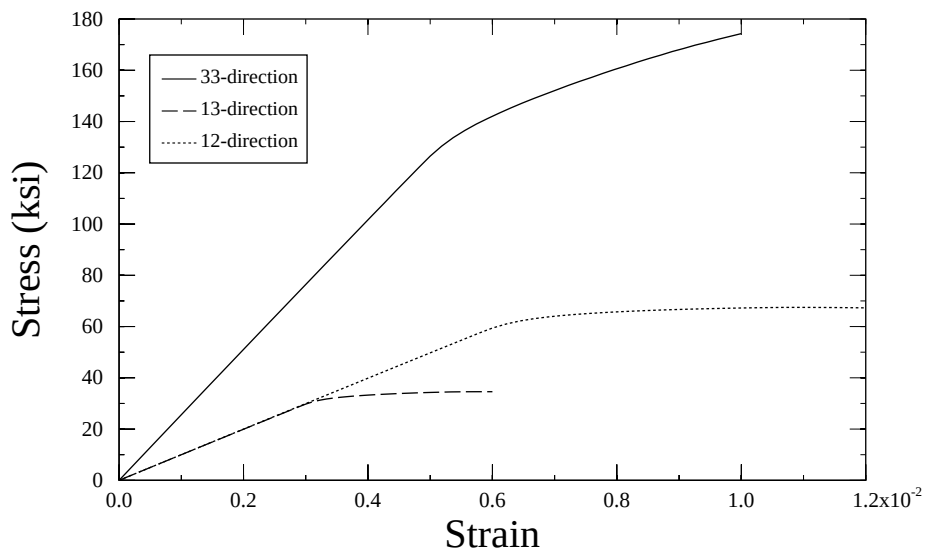
example of general loading
*PRINT
  NPL=1  %
*LOAD
  LCON=3 LOP=99 LSS=2,2,1,2,1,1 %
*MECH
  NPTW=2 TI=0.,108. LO=0.,0.
  NPTW=2 TI=0.,108. LO=0.,0.
  NPTW=2 TI=0.,108. LO=0.,0.01
  NPTW=2 TI=0.,108. LO=0.,0.
  NPTW=2 TI=0.,108. LO=0.,0.006
  NPTW=2 TI=0.,108. LO=0.,0.012
*THERM
  NPTT=2 TI=0.,108. TE=23.,223.
*MODEL
  MOD=1  %
*SOLVER
  NTF=1 NPTS=2 TIM=0.,108. STP=0.4 %
*FIBER
  NFIBS=1
  NF=1 MF=9 NDPT=2 IFM= 1 MAT=U
  NTP=6
  TEM=21.1,204.44,315.56,426.67,537.78,871.11
  EA=57.0E3,55.98E3,55.4E3,54.82E3,54.24E3,53.36E3
  ET=57.0E3,55.98E3,55.4E3,54.82E3,54.24E3,53.36E3
  NUA=0.25,0.25,0.25,0.25,0.25,0.25
  NUT=0.25,0.25,0.25,0.25,0.25,0.25
  GA=22.8E3,22.392E3,22.16E3,21.928E3,21.696E3,21.344E3
  ALPA=3.564E-6,3.618E-6,3.726E-6,3.906E-6,4.068E-6,4.572E-6
  ALPT=3.564E-6,3.618E-6,3.726E-6,3.906E-6,4.068E-6,4.572E-6
  D=1.,0.,0.
*MATRIX
  NMATX=1
  NM=1 MM=4 NDPT=2 MAT=A %
*MRVE
  IDP=11 VF=0.45 RAD=0.07 R=1.0
*CURVE
  NP=5 %
*MACRO
  NT=4
  NC=1 X=3 Y=9 NAM=GENLD-33
  NC=2 X=5 Y=11 NAM=GENLD-13
  NC=3 X=6 Y=12 NAM=GENLD-12
  NC=4 X=39 Y=1 NAM=GENLD-T %
*END
```

The following figures were obtained from the x-y plot data file produced by the present example.