ME 531- Inelastic Design Methods Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Homework #3 Due March 2, 2016

The stress-strain relationship proposed by Bodner is given below:





Please determine the stress-strain curve for temperature cycling between RT and 550°C under total constraint (total strain =0, bar held between two rigid walls, clamping is at RT). The heat-cool time is 200 seconds. Use linear interpolation for the constants between the end xtemperatures. Note that the total strain is the sum of elastic, inelastic and thermal strain rates. Comment on your results.

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Cu( copper) Cu

(R.T) (550°C)

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Do(1/sec) 104 104

n 7.5 3.9

Ko (MPa) 63 16

K1 (MPa) 250 250

m (MPa -1) 0.13 0.13

E (MPa) 120,000 100,000

CTE 20. 10-6 1/°C 20. 10-6 1/°C

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T

RT(20°C)

550°C

t

T