

Endpoints below have "coordinate" values of (strain, stress)

A has estimated point of (.015, 42)

B has estimated point of (.03, 42)

C has estimated point of (.06, 42)

D has estimated point of (.18, 60)

E has estimated point of (.27, 50)

Young's Modulus for 0 to A is 2800 (slope between origin and point A)

Variables needed:

Strain - Inputted strain value used for computation of stress as well as acknowledging in which segment to draw result from

Stress - Outputted value of stress based on strain value given.

Steps to follow:

Create different portions of the overall function separated by the endpoints A,B,C,D, and E.

Based on the inputted strain, the portion used to determine stress should be the part of the function that corresponds to the strain given. Eg. if the inputted strain is between 0 and A, the stress should be determined from the line between 0 and A.

Using the 2 endpoints of each portion, find the slope of that portion and the intercept and set this as the function used if the given strain is between the two endpoints used.

Output stress given by the function found.

Test Cases:

Edge cases:

0 to A:

1. Inputted strain = 0
Expected stress given = 0
(After testing) stress given = 0
2. Inputted strain = .014999
Expected stress given = 41.9999
(After testing) stress given = 41.9972

A to B

1. Inputted strain = .015
Expected stress given = 42
(After testing) stress given = 42
2. Inputted strain = .02999
Expected stress given = 42
(After testing) stress given = 42

B to C

1. Inputted strain = .03
Expected stress given = 42

(After testing) stress given = 42

2. Inputted strain = .05999

Expected stress given = 42

(After testing) stress given = 42

C to D

1. Inputted strain = .06

Expected stress given = 42

(After testing) stress given = 42

2. Inputted strain = .17999

Expected stress given = 59.9972

(After testing) stress given = 59.9985

D to E

1. Inputted strain = .18

Expected stress given = 60

(After testing) stress given = 60

2. Inputted strain = .27

Expected stress given = 50

(After testing) stress given = 50

Normal Cases:

0 to A:

1. Inputted strain = .01

Expected stress given = 28

(After testing) stress given = 28

A to B:

1. Inputted strain = .02

Expected stress given = 42

(After testing) stress given = 42

B to C

1. Inputted strain = .04

Expected stress given = 42

(After testing) stress given = 42

C to D

1. Inputted strain = .1

Expected stress given = 48

(After testing) stress given = 48

D to E

1. Inputted strain = .2

Expected stress given = 57.75

(After testing) stress given = 57.7778