
stressgloballaminate

Computes the global stresses for each ply

Inputs

qbarplies - Transformed reduced stiffness matrix for each ply
deltat - Temperature change
alphapplies - Coefficient of thermal expansion for each ply
betapplies - Coefficient of moisture expansion for each ply
deltac - Moisture change
nplies - Number of plies
angleplies - Angle of each ply in degrees
strainglobalplies - Global strains at top, middle, and bottom of each ply
 epsx - Global longitudinal strain
 epsy - Global transverse strain
 epsxy - Global in-plane strain

Outputs

[stressglobalplies] - Global stresses
 sx - Global longitudinal stress
 sy - Global transverse stress
 sxy - Global in-plane stress

Calling the Function

```
[stressglobalplies]=stressgloballaminate(strainglobalplies,qbarplies,  
                                          nplies,alphapplies,betapplies,  
                                          deltac)
```

Testing File

Click [here](#) to see a testing file for using the function stressgloballaminate

Example

Inputs:

Number of plies: 3
Total Thicknes of Laminate: 0.125
Change in Temperature: 100
Change in Moisture: 0.04

For Ply: 1

Transformed Reduced Stiffness Matrix

1.0e+11 *

1.0940	0.3246	0.5419
0.3246	0.2365	0.2005
0.5419	0.2005	0.3674

Coefficient of Thermal Expansion

alphax		5.64e-06
alphay		1.126e-05
alphaxy		1.688e-05

Coefficient of Moisture Expansion

betax		0.15
betay		0.3
betaxy		0.45

Global Strains

Top

Epsx		-7.1666
Epsx		7.1921
Gammaxy		-0.0244

Middle

Epsx		-4.7734
Epsx		4.799
Gammaxy		-0.0244

Bottom

Epsx		-2.3803
Epsx		2.4058
Gammaxy		-0.0244

For Ply: 2

Transformed Reduced Stiffness Matrix

1.0e+10 *

5.6660	4.2320	4.2870
4.2320	5.6660	4.2870
4.2870	4.2870	4.6590

Coefficient of Thermal Expansion

alphax		1.688e-05
alphay		1.126e-05
alphaxy		5.64e-06

Coefficient of Moisture Expansion

betax		0.45
betay		0.3
betaxy		0.15

Global Strains

Top

Epsx		-2.3803
Epsx		2.4058
Gammaxy		-0.0244

Middle

Epsx		0.01276
Epsx		0.01276
Gammaxy		-0.0244

Bottom

Epsx		2.4058
Epsx		-2.3803
Gammaxy		-0.0244

For Ply: 3

Transformed Reduced Stiffness Matrix

1.0e+11 *

0.2365	0.3246	0.2005
0.3246	1.0940	0.5419
0.2005	0.5419	0.7400

Coefficient of Thermal Expansion

alphax		-1.94676e-05
alphay		-2.248e-05
alphaxy		-1.94676e-05

Coefficient of Moisture Expansion

betax		-0.5196
betay		0.6
betaxy		-0.5196

Global Strains

Top

Epsx		2.4058
Epsx		-2.3803
Gamaxy		-0.0244

Middle

Epsx		4.799
Epsx		-4.7734
Gamaxy		-0.0244

Bottom

Epsx		7.1921
Epsx		-7.1666
Gamaxy		-0.0244

Outputs:

For Ply: 1

Global Stresses

Top

Sx		-5.54104E+11
Sx		-6.39421E+10
Txy		-2.46395E+11

Middle

Sx		-3.69968E+11
Sx		-4.28557E+10
Txy		-1.64689E+11

Bottom

Sx		-1.85846E+11
Sx		-2.17748E+10
Txy		-8.29908E+10

For Ply: 2

Global Stresses

Top

Sx		-3.60528E+10
Sx		3.2674E+10
Txy		-1.75616E+09

Middle

Sx		-1.73546E+09
Sx		-1.64136E+09
Txy		-1.75531E+09

Bottom

Sx		3.25799E+10
Sx		-3.59587E+10
Txy		-1.75616E+09

For Ply: 3

Global Stresses

Top		
Sx		-2.05693E+10
Sx		-1.84045E+11
Txy		-8.16073E+10
Middle		
Sx		-4.16502E+10
Sx		-3.68167E+11
Txy		-1.63314E+11
Bottom		
Sx		-6.27366E+10
Sx		-5.52303E+11
Txy		-2.45029E+11

Description

Outputs the global stresses for each ply