moduli_elasticity

Computes elastic modulii of a unidirectional lamina using the elasticity method

Inputs

Ef - Fiber elastic modulus
Em - Matrix elastic modulus
nuf - Fiber Poisson's ratio
numm - Matrix Poisson's ratio
Vf - Fiber volume fraction

Outputs

moduli - [E1 E2 nu12 G12]
E1 - Local longitudinal elastic modulus
E2 - Local transverse elastic modulus
nu12 - Local major Poisson's ratio
G12 - Local in-plane shear modulus

Calling the Function

[moduli]=moduli_elasticity(Ef,Em,nuf,numm,Vf)

Testing File

Click here to see a testing file for using the function moduli_elasticity

Example

Inputs:

Fiber Elastic Modulus: 8.5e+10
Matrix Elastic Modulus: 3.4e+09
Fiber Poisson's ratio: 0.2
Matrix Poisson's ratio: 0.3
Fiber Volume Fraction: 0.6

Outputs:

Lamina Modulii and Poisson's Ratios

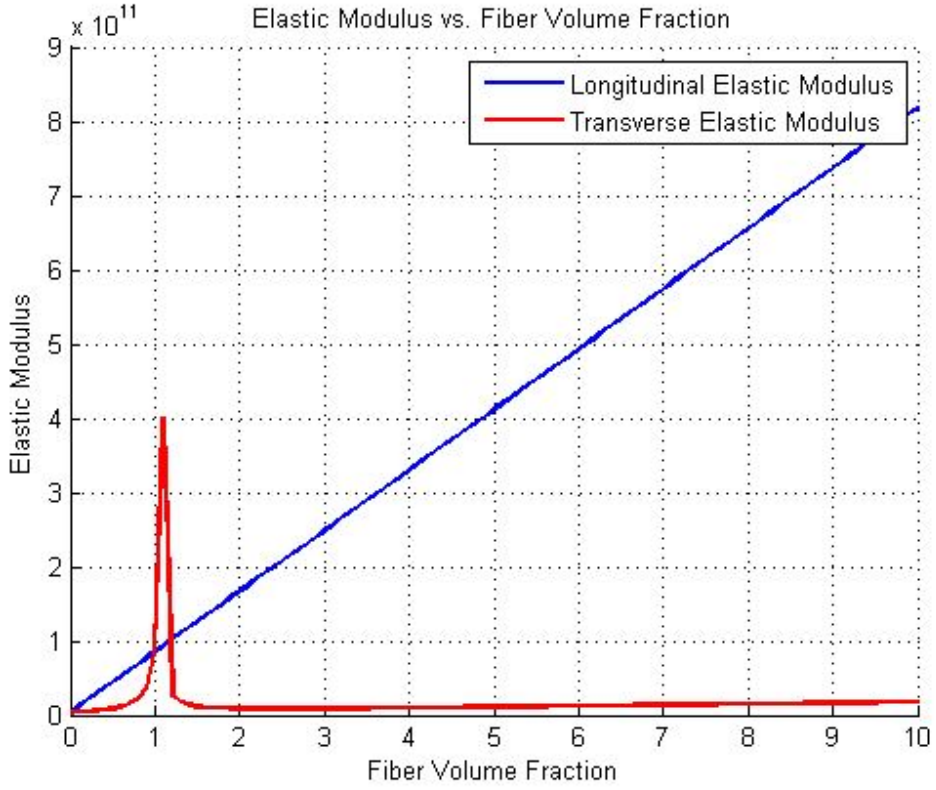
Ex	5.23701E+10
Ey	1.15998E+10
nuxy	0.232739
Gxy	4.59971E+09

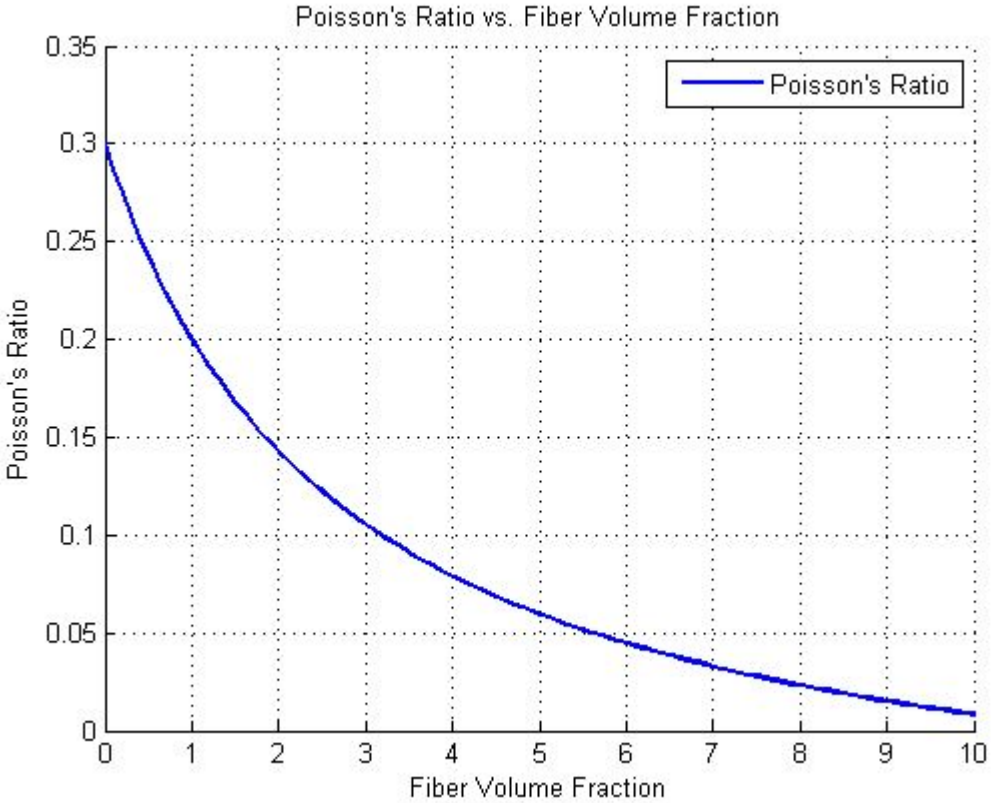
Table:

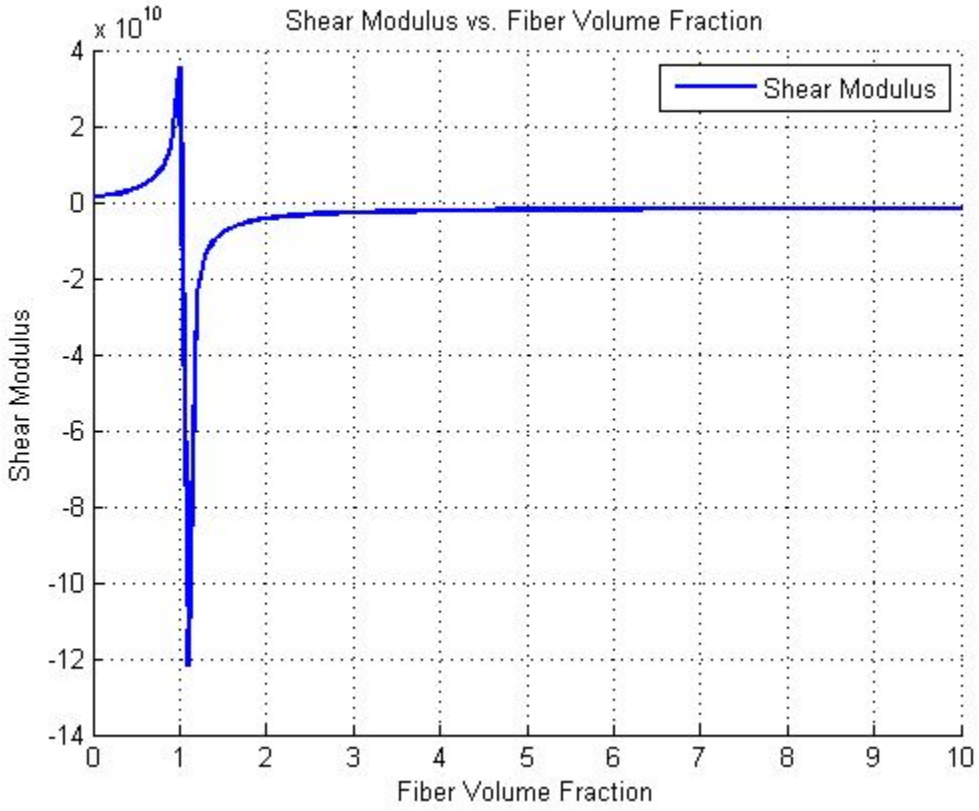
Lamina Modulii and Poisson's Ratios

Vf	Ex	Ey	nuxy	Gxy
0.00	3.4000E+09	3.4000E+09	0.3000	1.3077E+09
0.10	1.1564E+10	4.1950E+09	0.2868	1.5755E+09
0.20	1.9728E+10	4.9696E+09	0.2745	1.9044E+09
0.30	2.7890E+10	5.9459E+09	0.2630	2.3179E+09
0.40	3.6051E+10	7.2446E+09	0.2523	2.8537E+09
0.50	4.4211E+10	9.0337E+09	0.2422	3.5753E+09
0.60	5.2370E+10	1.1600E+10	0.2327	4.5997E+09
0.70	6.0529E+10	1.5511E+10	0.2238	6.1680E+09
0.80	6.8686E+10	2.2121E+10	0.2154	8.8700E+09
0.90	7.6843E+10	3.5731E+10	0.2075	1.4631E+10
1.00	8.5000E+10	8.5000E+10	0.2000	3.5417E+10

Graphs:


Elastic Modulus vs. Fiber Volume Fraction
x 10^11
Longitudinal Elastic Modulus
Transverse Elastic Modulus
Elastic Modulus
Fiber Volume Fraction
0
1
2
3
4
5
6
7
8
9
10


Poisson's Ratio vs. Fiber Volume Fraction
Poisson's Ratio
Poisson's Ratio
Fiber Volume Fraction
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
1
2
3
4
5
6
7
8
9
10



Description

Outputs elastic modulii and Poisson's ratio of a unidirectional lamina in matrix form: [E1 E2 nu12 G12]