anglemoduli

Computes two-dimensional elastic modulii and Poisson's ratio for a unidirectional lamina

Inputs

angle - Angle of ply in degrees
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

Outputs

moduli_ang - [Ex Ey nuxy Gxy Mx My]
- **Ex** - Global longitudinal elastic modulus
- **Ey** - Global transverse elastic modulus
- **nuxy** - Global major Poisson's ratio
- **Gxy** - Global in-plane shear modulus
- **Mx** - Shear coupling with axial load in x-direction
- **My** - Shear coupling with axial load in y-direction

Calling the Function

```
[moduli_ang]= anglemoduli(moduli,angle)
```

Testing File

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

Example

Inputs:

```
Longitudinal Elastic Modulus: 181
Transverse Elastic Modulus: 10.3
Poisson's Ratio: 0.28
Shear Modulus: 7.17
Angle of Lamina: 40.6
```

Outputs:

Angle Lamina Engineering Constants

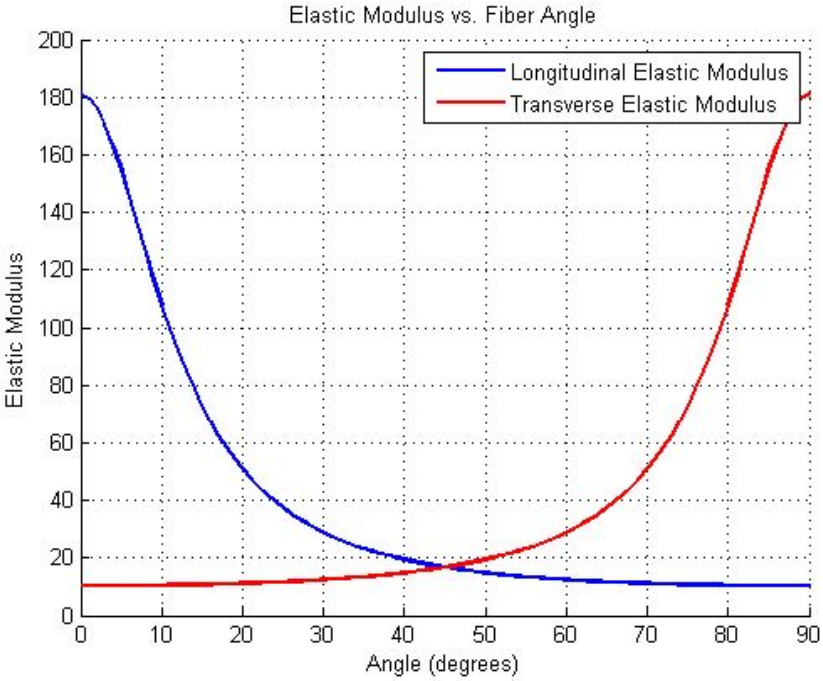
Ex	19.0311
Ey	15.0255
nuxy	0.186321
Gxy	9.38999
Mx	8.65083
My	7.7269

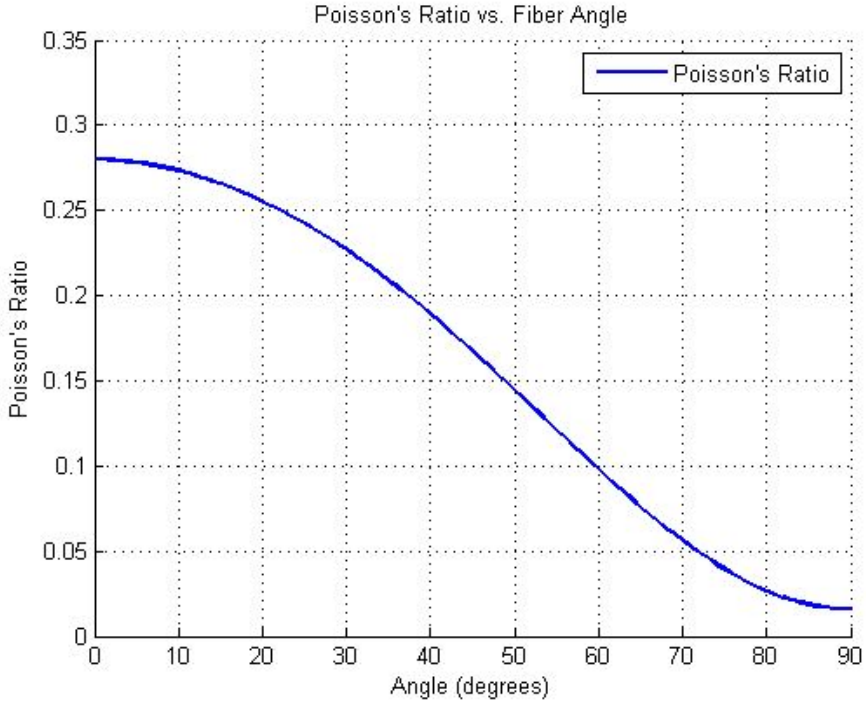
Table:

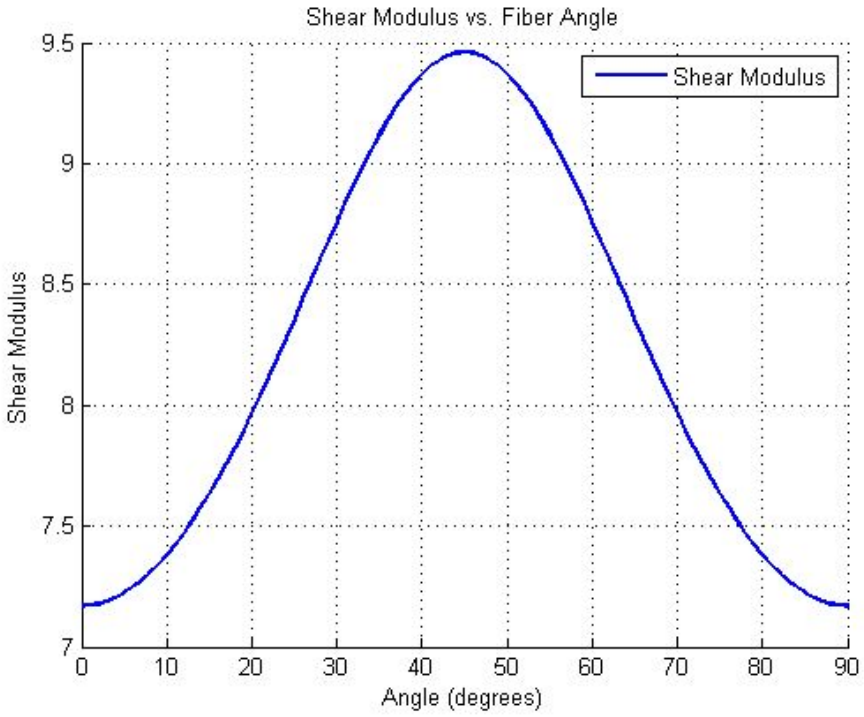
Angle Lamina Engineering Constants

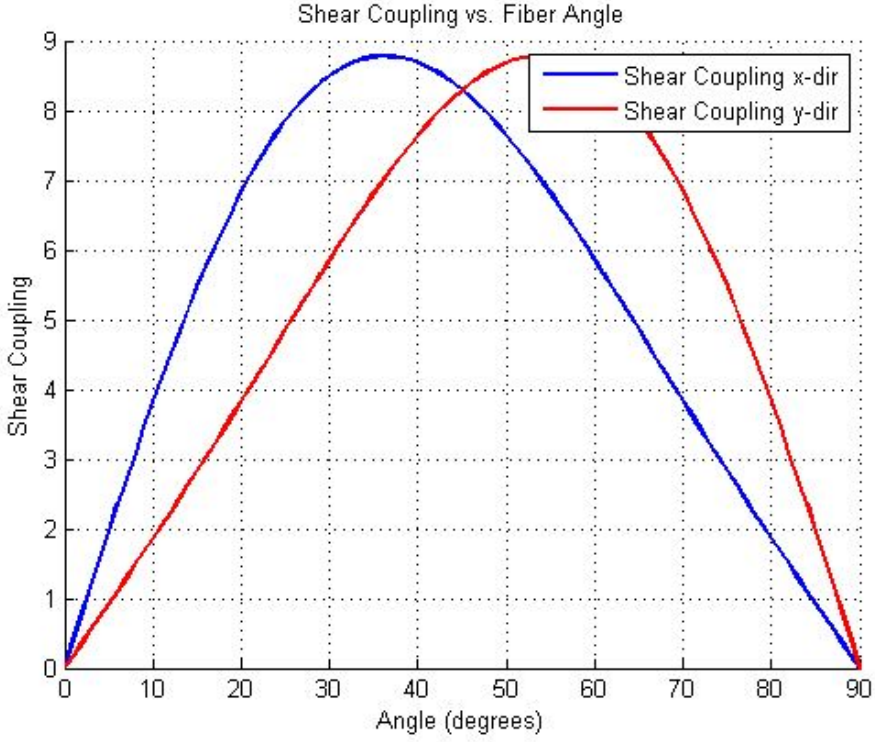
angle	Ex	Ey	nuxy	Gxy	Mx	My
0	1.8100e+02	1.0300e+01	2.8000e-01	7.1700e+00	0.0000e+00	0.0000e+00
10	1.0784e+02	1.0492e+01	2.7330e-01	7.3790e+00	3.8162e+00	1.8521e+00
20	5.0702e+01	1.1128e+01	2.5526e-01	7.9669e+00	6.8310e+00	3.8218e+00
30	2.8780e+01	1.2418e+01	2.2672e-01	8.7606e+00	8.4994e+00	5.8531e+00
40	1.9401e+01	1.4827e+01	1.8884e-01	9.3699e+00	8.6831e+00	7.6380e+00
50	1.4827e+01	1.9401e+01	1.4432e-01	9.3699e+00	7.6380e+00	8.6831e+00
60	1.2418e+01	2.8780e+01	9.7826e-02	8.7606e+00	5.8531e+00	8.4994e+00
70	1.1128e+01	5.0702e+01	5.6024e-02	7.9669e+00	3.8218e+00	6.8310e+00
80	1.0492e+01	1.0784e+02	2.6590e-02	7.3790e+00	1.8521e+00	3.8162e+00
90	1.0300e+01	1.8100e+02	1.5934e-02	7.1700e+00	0.0000e+00	0.0000e+00

Graphs:


Elastic Modulus vs. Fiber Angle
Longitudinal Elastic Modulus
Transverse Elastic Modulus
Elastic Modulus
Angle (degrees)
0
20
40
60
80
100
120
140
160
180
200
0
10
20
30
40
50
60
70
80
90


Poisson's Ratio vs. Fiber Angle
Poisson's Ratio
Poisson's Ratio
Angle (degrees)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0
10
20
30
40
50
60
70
80
90


Shear Modulus vs. Fiber Angle
Shear Modulus
Shear Modulus
Angle (degrees)
9.5
9
8.5
8
7.5
7
0
10
20
30
40
50
60
70
80
90


Shear Coupling vs. Fiber Angle
Shear Coupling x-dir
Shear Coupling y-dir
Shear Coupling
Angle (degrees)
9
8
7
6
5
4
3
2
1
0
0
10
20
30
40
50
60
70
80
90

Description

Outputs global elastic modulii and Poisson's ratio in matrix form:
[Ex Ey nuxy Gxy Mx My]