

AE-681 Composite Materials
Assignment No. 2

The following composite materials are transversely isotropic materials. Compute the transformed stiffness and compliance matrices. Plot the following coefficients in MPa units vs the angle of fibre rotations in degree units. The angle θ° varies from -90° to $+90^\circ$. The plots should look continuous. Use double precision for the computation. Use grid while plotting.

Plot 1: $\bar{C}_{11}, \bar{C}_{22}, \bar{C}_{33}$ vs θ° .

Plot 2: $\bar{C}_{12}, \bar{C}_{13}, \bar{C}_{23}, \bar{C}_{45}$ vs θ° .

Plot 3: $\bar{C}_{16}, \bar{C}_{26}, \bar{C}_{36}$ vs θ° .

Plot 4: $\bar{C}_{44}, \bar{C}_{55}, \bar{C}_{66}$ vs θ° .

Plot 5: $\bar{S}_{11}, \bar{S}_{22}, \bar{S}_{33}$ vs θ° .

Plot 6: $\bar{S}_{12}, \bar{S}_{13}, \bar{S}_{23}, \bar{S}_{45}$ vs θ° .

Plot 7: $\bar{S}_{16}, \bar{S}_{26}, \bar{S}_{36}$ vs θ° .

Plot 8: $\bar{S}_{44}, \bar{S}_{55}, \bar{S}_{66}$ vs θ° .

Material id.	Material Name	E_1 (GPa)	$E_2=E_3$ (GPa)	G_{12} (GPa)	ν_{12}	ν_{23}
1	AS4/3501-6	148	10.5	5.61	0.30	0.59
2	T300/5208	132	10.8	5.65	0.24	0.49
3	Kevlar/Epoxy	76.8	5.5	2.07	0.34	0.37
4	Boron/Al	227	139	57.6	0.24	0.36
5	SCS-6/Ti-15-3	221	145	53.2	0.27	0.40
6	S2 glass/Epoxy	43.5	11.5	3.45	0.27	0.40
7	T700/M21	116.47	8.9	5.3	0.30	0.40
8	M55J/M18	280	6.0	4.9	0.30	0.30
9	AS4/PEEK (APC-2)	142	10.0	8.0	0.26	0.45
10	Graphite/Epoxy	172.4	6.9	3.5	0.25	0.25
11	IM6/914	170	10.8	5.8	0.34	0.40
12	AS4/3501-6 Epoxy	126	11	6.6	0.28	0.40
13	T300/BSL914C Epoxy	138	11	5.5	0.28	0.40
14	E-glass/ LY556/HT907/DY063	53.48	17.7	5.83	0.278	0.40
15	E-glass/ MY750/HY917/DY063	45.6	16.2	5.83	0.278	0.40