Test Cases for Mohr's Circle App

Legend :

- **Sigma_xx, Sigma_yy, Sigma_zz, sigma_xy, sigma_yz, sigma_zx** - Input Stresses
- **epsi_xx, epsi_yy, epsi_zz, epsi_xy, epsi_yz, epsi_zx** - Input Strains
- **phi** - Angle made by the principal plane
- **sigma_1, sigma_2, sigma_3** - Principal stress
- **epsi_1, epsi_2, epsi_3** - Principal strains
- **sigma_x', sigma_y', sigma_xy'** - Resulting stresses on the plane which makes an angle of the 'angle'.
- **sigma_nn, sigma_nm** - Normal and shear stress from the given angle inputs of 3-D stresses
- **epsi_x', epsi_y', epsi_xy'** - Resulting stresses on the plane which makes an angle of the 'angle'.
- **epsi_nn, epsi_nm** - Normal and shear stress from the given angle inputs of 3-D stresses

FOR 2-D Stress

	Input				Expected Value						Output value (computed)						diff = Expected - Output					
	Sigma_xx	Sigma_yy	Sigma_xy	angle	Sigma_1	Sigma_2	Sigma_x'	Sigma_y'	Sigma_xy'	Phi	Sigma_1	Sigma_2	Sigma_x'	Sigma_y'	Sigma_xy'	Phi	diff_S1	diff_S2	diff_Sx'	diff_Sy'	diff_Sxy'	diff_Phi
1	34.3	74	83.9	54.6	140.37	-32.066	139.91	-31.611	-8.846	-38.34389472	140.3662	-32.0662	139.911	-31.611	-8.846	-38.34	0.0038	0.0002	-0.001	0	0	-0.003894715069
2	23.8	66.8	8	2.9	68.24	22.36	24.719	65.881	10.132	-10.20494142	68.2401	22.359	24.7185	65.88148	10.13175	-10.21	-0.0001	0.001	0.0005	-0.00048	0.00025	0.005058583098
3	87.1	45.2	65.3	4.1	134.73	-2.4284	96.199	36.101	61.644	36.10649768	134.7284	-2.4284	96.19948	36.100518	61.6443	36.11	0.0016	0	-0.00048	0.000482	-0.0003	-0.00350231545
4	60.8	39.9	94.3	29.5	145.23	-44.527	136.56	-35.863	39.611	41.83869041	145.2272	-44.5272	136.563	-35.863	39.61069	41.84	0.0028	0.0002	-0.003	0	0.00031	-0.001309593617
5	80.3	82.1	34.2	11.2	115.41	46.988	93.401	68.999	31.962	-44.2471192	115.4118	46.9882	93.4005	68.999	31.9624	-44.25	-0.0018	-0.0002	0.0005	0	-0.0004	0.002880800843
6	94.7	17	75.2	13.3	140.49	-28.793	124.26	-12.559	49.845	31.33860562	140.4926	-28.7926	124.25937	-12.55937	49.8449	31.34	-0.0026	-0.0004	0.00063	0.00037	0.0001	-0.001394382427
7	59.2	19.9	62.9	7.6	105.45	-26.348	75.004	4.0957	55.548	36.32599603	105.4479	-26.3479	75.004	4.0957	55.547	36.33	0.0021	-0.0001	0	0	0.001	-0.004003971377
8	47.9	57.4	69	20.9	121.81	-16.513	95.1	10.2	54.604	-43.03158901	121.8133	-16.5133	95.0997	10.20027	54.60387	-43.03	-0.0033	0.0003	0.0003	-0.00027	0.00013	-0.001589013375
9	28.2	73.1	53.9	20.8	109.04	-7.7385	69.648	31.652	55.211	-33.69350201	109.0385	-7.7385	69.6424	31.6524	55.21146	-33.69	0.0015	0	0.0056	-0.0004	-0.00046	-0.003502009974
10	9.5	92.5	54.4	46.2	119.42	-17.422	107.09	-5.0901	39.186	-26.33091374	119.4223	-17.4223	107.09	-5.09012	39.18556	-26.33	-0.0023	0.0003	0	0.00002	0.00044	-0.0009137356955

FOR 3-D Stress

	Input									Expected value						Output value (computed)						diff = Expected - Output					
	Sigma_xx	Sigma_yy	Sigma_zz	Sigma_xy	Sigma_yz	Sigma_zx	theta_1	theta2	theta3	Sigma_1	Sigma_2	Sigma_3	Tou_max	Sigma_nn	Sigma_nm	Sigma_1	Sigma_2	Sigma_3	Tou_max	Sigma_nn	Sigma_nm	diff_S1	diff_S2	diff_S3	diff_T_max	diff_Sigma_nn	diff_Sigma_nn
1	77.6	26.8	33.7	50.8	35.4	14.4	74	61	34	120.5058	34.1109	-16.5168	68.5113	5.821	39.12	120.5058	34.1109	-16.5168	68.511	5.8299	39.16328	0	0	0	0.0003	-0.0089	-0.04328
2	44.6	11	90.1	78.2	76.7	51.9	66	117	37	189.332	15.6884	-59.3204	124.3262	-3.28	90.635	189.332	15.6884	-59.3204	124.326	-2.67	90.511	0	0	0	0.0002	-0.61	0.124
3	38.9	82.3	73.5	47.2	82.4	81.8	124	126	54	209.4459	16.3979	-31.1438	120.2949	60.398	102.457	209.4459	16.3979	-31.1438	120.295	60.473	102.3486	0	0	0	-0.0001	-0.075	0.1084
4	15.8	30.8	52.5	76.7	37.6	38.1	127	57	55	135.0076	17.958	-53.8656	94.4366	36.503	79.494	135.0076	17.958	-53.8656	94.437	35.9162	79.997	0	0	0	-0.0004	0.5868	-0.503
5	45.2	13	94.9	19	47.6	63.4	97	104	16	155.7761	9.6369	-12.3131	84.0446	-8.5	20.825	155.7761	9.6369	-12.3131	84.045	-8.52578	20.84237	0	0	0	-0.0004	0.02578	-0.01737
6	64.4	3.9	84.6	17.3	82.6	53.7	80	158	71	165.9236	36.5914	-49.615	107.7693	31.201	35.618	165.9236	36.5914	-49.615	107.769	30.9903	35.9924	0	0	0	0.0003	0.2107	-0.3744
7	17.1	54.2	13.8	80.3	70.1	81.2	64	68	36	184.0083	-32.4085	-66.4997	125.254	-12.712	96.886	184.0083	-32.4085	-66.4997	125.254	-13.647168	97.00037	0	0	0	0	0.935168	-0.11437
8	95.1	43.8	31.4	88	47.2	15.7	58	105	36	173.2464	32.9245	-35.8709	104.5587	27.378	92.702	173.2464	32.9245	-35.8709	104.559	27.485	92.66757	0	0	0	-0.0003	-0.107	0.03443
9	68.5	31.6	39	29.1	34.4	12.2	89	53	37	98.6517	42.8033	-2.355	50.5034	14.031	21.753	98.6517	42.8033	-2.355	50.503	14.0397	21.75319	0	0	0	0.0004	-0.0087	-0.00019
10	65.8	80	14.9	70	71.7	12.3	129	70	47	169.2503	32.1513	-40.7016	104.976	51.86	97.708	169.2503	32.1513	-40.7016	104.976	50.885	98.3485	0	0	0	0	0.975	-0.6405

FOR 2-D Strain

	Input				Expected Value						Output value (computed)						diff = Expected - Output					
	epsi_xx	epsi_yy	epsi_xy	angle	epsi_1	epsi_2	epsi_x'	epsi_y'	epsi_xy'	Phi	epsi_1	epsi_2	epsi_x'	epsi_y'	epsi_xy'	Phi	diff_S1	diff_S2	diff_Sx'	diff_Sy'	diff_Sxy'	diff_Phi
1	34.3	74	83.9	54.6	100.56	7.74	100.29	8.01	9.9	-32.33865658	100.5593	7.7407	100.29	8.005	9.89	-32.34	0.0007	-0.0007	0	0.005	0.01	0.001343423202
2	23.8	66.8	8	2.9	67.17	23.43	24.31	66.29	12.3	-5.269591864	67.1689	23.4311	24.314	66.2857	12.304	-5.27	0.0011	-0.0011	-0.004	0.0043	-0.004	0.0004081356859
3	87.1	45.2	65.3	30	104.94	27.36	104.9	27.4	-3.64	28.6567907	104.9434	27.3566	104.9	27.399	-3.636	28.66	-0.0034	0.0034	0	0.001	-0.004	-0.003209301848
4	60.8	39.9	94.3	29.5	98.64	2.06	96.15	4.55	30.65	38.75168143	98.6442	2.0558	96.147	4.552	30.653	38.75	-0.0042	0.0042	0.003	-0.002	-0.003	0.001681427146
5	80.3	82.1	34.2	45	98.32	64.08	98.3	64.1	1.8	-43.49360625	98.3237	64.0763	98.299	64.1	1.799	-43.49	-0.0037	0.0037	0.001	0	0.001	-0.003606247908
6	94.7	17	75.2	13.3	109.92	1.78	107.42	4.28	32.45	22.03163281	109.9155	1.7845	107.424	4.276	32.449	22.03	0.0045	-0.0045	-0.004	0.004	0.001	0.001632811469
7	59.2	19.9	62.9	60	76.63	2.47	56.96	22.14	-65.48	29.00140271	76.634	2.466	56.961	22.138	-65.485	29	-0.004	0.004	-0.001	0.002	0.005	0.001402706314
8	47.9	57.4	69	20.9	87.48	17.82	72.1	33.2	57.77	-41.08036833	87.4755	17.8245	72.104	33.195	57.769	-41.08	0.0045	-0.0045	-0.004	0.005	0.001	-0.0003683340973
9	28.2	73.1	53.9	20.8	85.73	15.57	51.75	49.55	70.12	-25.10244313	85.7257	15.5743	51.755	49.545	70.117	-25.1	0.0043	-0.0043	-0.005	0.005	0.003	-0.002443125055
10	9.5	92.5	54.4	46.2	100.62	1.38	79.91	22.09	80.65	-16.62085139	100.6195	1.3805	79.913	22.086	80.649	-16.62	0.0005	-0.0005	-0.003	0.004	0.001	-0.0008513875268

FOR 3-D Strain

	Input									Expected value						Output value (computed)						diff = Expected - Output					
	epsi_xx	epsi_yy	epsi_zz	epsi_xy	epsi_yz	epsi_zx	theta_1	theta2	theta3	epsi_1	epsi_2	epsi_3	Tou_max	epsi_NN	epsi_NS	epsi_1	epsi_2	epsi_3	Tou_max	epsi_NN	epsi_NS	diff_S1	diff_S2	diff_S3	diff_T_max	epsi_NN	epsi_NS
1	77.6	26.8	33.7	50.8	35.4	14.4	74	61	34	91.4	38.4	8.3	41.5	21.674	23.64	91.3849	38.4227	8.2924	41.546	21.709	23.653	0.0151	-0.0227	0.0076	-0.046	-0.035	-0.013
2	44.6	11	90.1	78.2	76.7	51.9	66	117	37	125.7	38.5	-18.4	72.1	16.994	53.353	125.5059	38.5348	-18.3442	71.927	17.2086	53.2047	0.1941	-0.0348	-0.0558	0.173	-0.2146	0.1483
3	38.9	82.3	73.5	47.2	82.4	81.8	124	126	54	139.7	43.4	11.6	64.1	62.686	53.575	139.7405	43.377	11.5818	64.079	62.622	53.6358	-0.0405	0.023	0.0182	0.021	0.064	-0.0608
4	15.8	30.8	52.5	76.7	37.6	38.1	127	57	55	84.5	30.5	-15.9	50.2	34.421	41.957	84.5456	30.4589	-15.9045	50.225	34.27	42.163	-0.0456	0.0411	0.0045	-0.025	0.151	-0.206
5	45.2	13	94.9	19	47.6	63.4	97	104	16	116.6	29.9	6.6	55	9.58	14.238	116.6344	29.911	6.5545	55.04	9.5607	14.257	-0.0344	-0.011	0.0455	-0.04	0.0193	-0.019
6	64.4	3.9	84.6	17.3	82.6	53.7	80	158	71	117	49.5	-13.6	65.3	44.64	23.368	117.013	49.2367	-13.5733	65.293	44.547	23.5084	-0.013	0.2633	-0.0267	0.007	0.093	-0.1404
7	17.1	54.2	13.8	80.3	70.1	81.2	64	68	36	108.5	1.9	-25.3	66.9	4.558	51.584	108.4102	2.0159	-25.3262	66.868	4.1753	51.6333	0.0898	-0.1159	0.0262	0.032	0.3827	-0.0493
8	95.1	43.8	31.4	88	47.2	15.7	58	105	36	124.2	39.9	6.2	59	41.608	52.272	124.2007	39.9195	6.1798	59.01	41.5951	52.2948	-0.0007	-0.0195	0.0202	-0.01	0.0129	-0.0228
9	68.5	31.6	39	29.1	34.4	12.2	89	53	37	77.3	45.3	16.5	30.4	26.954	13.863	77.3321	45.2614	16.5065	30.413	26.9449	13.8477	-0.0321	0.0386	-0.0065	-0.013	0.0091	0.0153
10	65.8	80	14.9	70	71.7	12.3	129	70	47	118.6	44.3	-2.3	60.5	51.083	56.509	118.6486	44.3289	-2.2775	60.463	51.017	56.562	-0.0486	-0.0289	-0.0225	0.037	0.066	-0.053