

Post Adjustment Statistics for HW5

$$\text{Global test: test statistic} = \frac{\mathbf{v}^T \mathbf{W} \mathbf{v}}{\sigma_0^2}$$

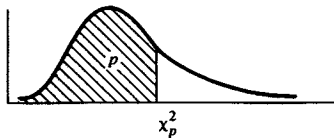
Critical values for 2-sided test, for alpha=0.05 and r=13

$$\chi_{\alpha/2, r}^2 = 5.01 = \text{chi2inv}(0.025, 13)$$

$$\chi_{1-\alpha/2, r}^2 = 24.7 = \text{chi2inv}(0.975, 13)$$

Also from table in textbook,

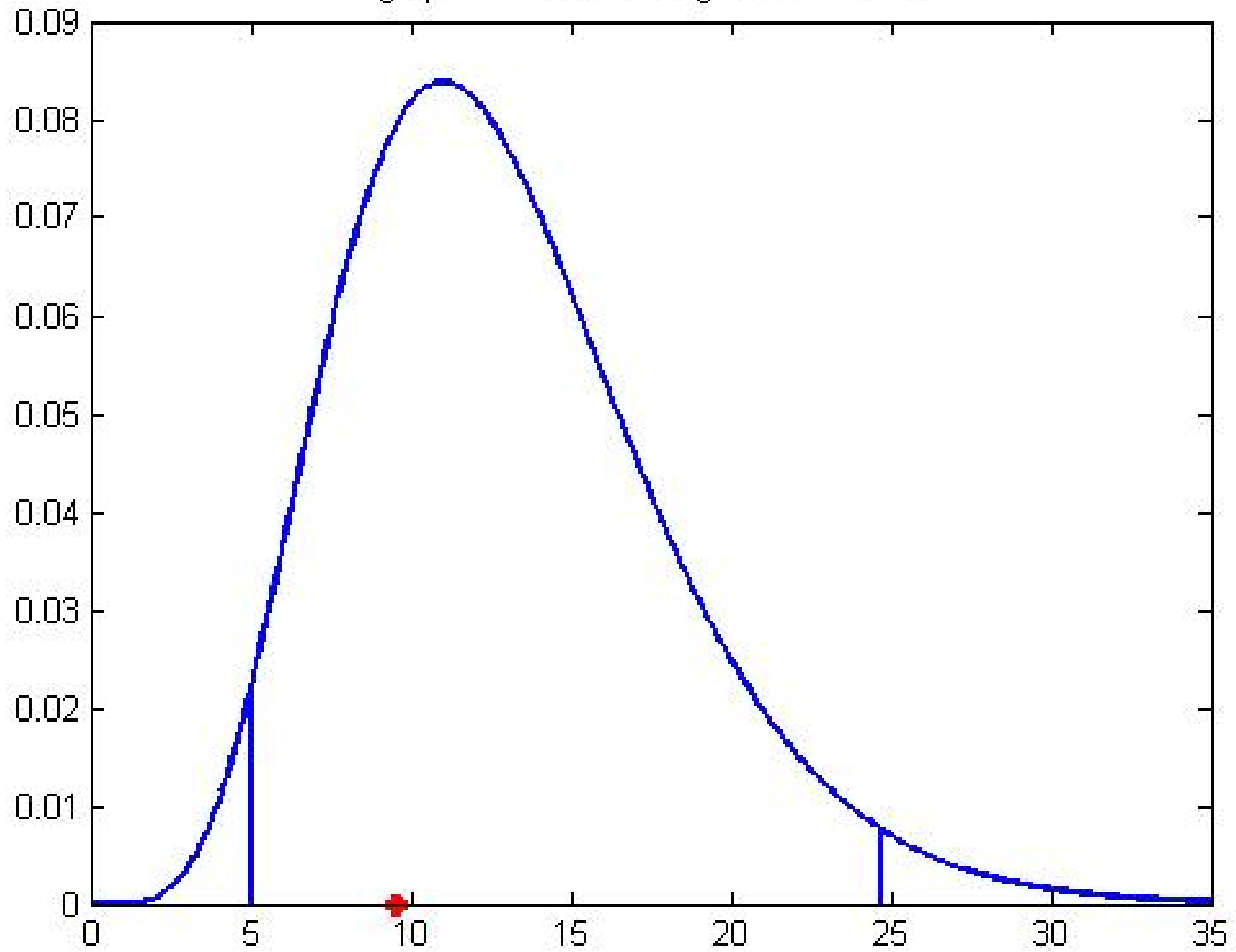
Table II. Percentiles of the Chi-Square Distribution



DEGREES OF FREEDOM	$\chi^2_{.995}$	$\chi^2_{.99}$	$\chi^2_{.975}$	$\chi^2_{.95}$	$\chi^2_{.90}$	$\chi^2_{.85}$	$\chi^2_{.80}$	$\chi^2_{.75}$	$\chi^2_{.70}$	$\chi^2_{.65}$	$\chi^2_{.60}$	$\chi^2_{.55}$	$\chi^2_{.50}$	$\chi^2_{.45}$	$\chi^2_{.40}$	$\chi^2_{.35}$	$\chi^2_{.30}$
1	.000	.000	.001	.004	.016	.064	.148	.255	.385	.521	.676	.842	1.000	1.163	1.327	1.493	1.650
2	.010	.020	.051	.103	.211	.446	.713	1.064	1.386	1.679	2.000	2.338	2.703	3.000	3.219	3.453	3.695
3	.072	.115	.216	.352	.584	1.00	1.42	1.801	2.179	2.538	2.898	3.219	3.581	3.893	4.108	4.353	4.608
4	.207	.297	.484	.711	1.06	1.65	2.20	2.703	3.146	3.541	3.893	4.219	4.538	4.808	5.021	5.193	5.348
5	.412	.554	.831	1.15	1.61	2.34	3.00	3.503	3.946	4.341	4.693	5.019	5.338	5.608	5.821	6.003	6.158
6	.676	.872	1.24	1.64	2.20	3.07	3.83	4.338	4.781	5.176	5.528	5.849	6.168	6.438	6.651	6.823	6.978
7	.989	1.24	1.69	2.17	2.83	3.82	4.67	5.168	5.611	6.006	6.358	6.679	6.998	7.268	7.501	7.693	7.848
8	1.34	1.65	2.18	2.73	3.49	4.59	5.53	6.028	6.471	6.866	7.218	7.539	7.858	8.128	8.361	8.553	8.708
9	1.73	2.09	2.70	3.33	4.17	5.38	6.39	6.888	7.331	7.726	8.078	8.399	8.718	8.988	9.221	9.413	9.568
10	2.16	2.56	3.25	3.94	4.87	6.18	7.27	7.768	8.211	8.606	8.958	9.279	9.598	9.868	10.101	10.293	10.448
11	2.60	3.05	3.82	4.57	5.58	6.99	8.15	8.648	9.091	9.486	9.838	10.159	10.478	10.748	10.981	11.173	11.328
12	3.07	3.57	4.40	5.23	6.30	7.81	9.03	9.528	9.971	10.366	10.718	11.039	11.358	11.628	11.861	12.053	12.208
13	3.57	4.11	5.01	5.89	7.04	8.63	9.93	10.418	10.861	11.256	11.608	11.929	12.248	12.518	12.751	12.943	13.108
14	4.07	4.66	5.63	6.57	7.79	9.47	10.8	11.298	11.741	12.136	12.488	12.809	13.128	13.398	13.631	13.823	13.978
15	4.60	5.23	6.26	7.26	8.55	10.3	11.7	12.188	12.631	13.026	13.378	13.709	14.028	14.298	14.531	14.723	14.878
16	5.14	5.81	6.91	7.96	9.31	11.2	12.6	13.078	13.521	13.916	14.268	14.589	14.908	15.178	15.411	15.603	15.758
17	5.70	6.41	7.56	8.67	10.1	12.0	13.5	13.968	14.411	14.806	15.158	15.479	15.798	16.068	16.301	16.493	16.648
18	6.26	7.01	8.23	9.39	10.9	12.9	14.4	14.918	15.361	15.756	16.108	16.429	16.748	17.018	17.251	17.443	17.598
19	6.83	7.63	8.91	10.1	11.7	13.7	15.4	15.868	16.311	16.706	17.058	17.379	17.698	17.968	18.201	18.393	18.548
20	7.43	8.26	9.59	10.9	12.4	14.6	16.3	16.818	17.261	17.656	18.008	18.329	18.648	18.918	19.151	19.343	19.498
21	8.03	8.90	10.3	11.6	13.2	15.4	17.2	17.768	18.211	18.606	18.958	19.279	19.598	19.868	20.101	20.293	20.448
22	8.64	9.54	11.0	12.3	14.0	16.3	18.1	18.718	19.161	19.556	19.908	20.229	20.548	20.818	21.051	21.243	21.398
23	9.26	10.2	11.7	13.1	14.8	17.2	19.0	19.668	20.111	20.506	20.858	21.179	21.498	21.768	21.991	22.183	22.338
24	9.89	10.9	12.4	13.8	15.7	18.1	19.9	20.618	21.061	21.456	21.808	22.129	22.448	22.718	22.951	23.143	23.298
25	10.5	11.5	13.1	14.6	16.5	18.9	20.9	21.568	21.961	22.356	22.708	23.029	23.348	23.618	23.851	24.043	24.198
26	11.2	12.2	13.8	15.4	17.3	19.8	21.8	22.518	22.911	23.306	23.658	23.979	24.298	24.568	24.801	25.003	25.158
27	11.8	12.9	14.6	16.2	18.1	20.7	22.7	23.468	23.861	24.256	24.608	24.929	25.248	25.518	25.751	25.943	26.098
28	12.5	13.6	15.3	16.9	18.9	21.6	23.6	24.418	24.811	25.206	25.558	25.879	26.198	26.468	26.701	26.893	27.048
29	13.1	14.3	16.0	17.7	19.8	22.5	24.6	25.368	25.761	26.156	26.508	26.829	27.148	27.418	27.651	27.843	27.998
30	13.8	15.0	16.8	18.5	20.6	23.4	25.5	26.318	26.711	27.106	27.458	27.779	28.098	28.368	28.601	28.793	28.948
40	20.7	22.1	24.4	26.5	29.0	32.3	34.9	37.158	38.561	40.286	41.678	43.159	44.638	46.118	47.598	49.078	50.658
50	28.0	29.7	32.3	34.8	37.7	41.4	44.3	47.758	49.331	51.176	52.988	54.789	56.588	58.383	60.173	61.958	63.748
60	35.5	37.5	40.5	43.2	46.5	50.6	53.8	57.938	59.631	61.676	63.688	65.659	67.588	69.473	71.313	73.148	74.978

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graphic illustration of global test hw5



95% confidence ellipse for point 2

$$\Sigma_{XX} = \begin{bmatrix} 0.0004756 & -0.0000718 \\ -0.0000718 & 0.0007296 \end{bmatrix}$$

$$\lambda_1 = 0.0007485$$

$$\lambda_2 = 0.0004567$$

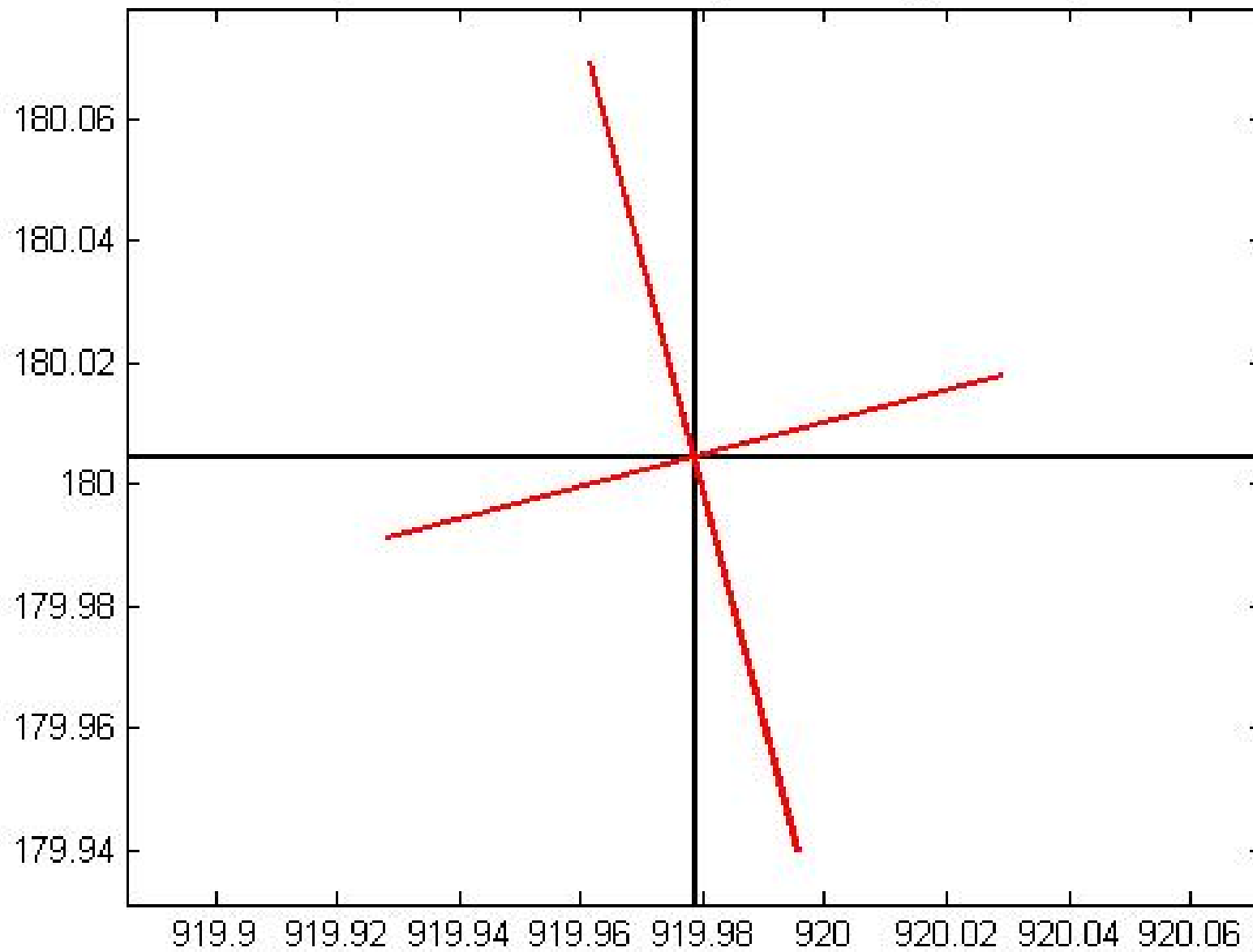
$$ev_1 = \begin{bmatrix} 0.2544 \\ -0.9671 \end{bmatrix}, \theta = -75.26 \text{ deg}, \text{ azimuth} = 165.26 \text{ deg}$$

$$ev_2 = \begin{bmatrix} -0.9671 \\ -0.2544 \end{bmatrix}$$

$$\text{major axis} = \sqrt{\chi_{0.95,2}^2 \lambda_1} = 0.06697$$

$$\text{minor axis} = \sqrt{\chi_{0.95,2}^2 \lambda_2} = 0.05231$$

major and minor axes of ellipse scaled by probability



95% confidence ellipse

