My Notes state:

Influence Diagnostics

Cook's D : influence statistic (D is for distance)

- The boundary of a simultaneous regional confidence region for all regression coefficients
- this does not follow an F distribution, but it is useful to compare it to the percentiles of the F distribution [$F_{1-\alpha;\, p,\, n-p}$] where a change of < 10^{th} or 20^{th} percentile shows little effect, while the 50^{th} percentile is considered large

Quote from authority: Neter, J., Kutner, M. H., Nachtsheim, C. J., and Wasserman, W., *Applied Linear Statistical Models*, 4th Edition, Richard D. Irwin, Inc., Burr Ridge, Illinois, 1996.

> "For interpreting Cook's distance measure, it has been found useful to relate D_i to the distribution and ascertain the corresponding percentile value. If the percentile is less than about 10 or 20 percent, the i^{th} case has little apparent influence on the fitted values. If, on the other hand, the percentile value is near 50 percent or more, the fitted values obtained with and without the i^{th} case should be considered to differ substantially, implying the i^{th} case has a major influence on the fit of the regression function." page 381

Quote from authority: Kutner, M. H., Nachtsheim, C. J., Neter, J. and Li, W. *Applied Linear Statistical Models*, 5th Edition, Richard D. Irwin, Inc., Burr Ridge, Illinois, 2005.

> The same exact text occurs on page 403.

"Cook's distance" From Wikipedia

Detecting highly influential observations

There are different opinions regarding what cut-off values to use for spotting highly influential points. A simple operational guideline of $D_i > 1$ has been suggested.[1] Others have indicated that $D_i > 4 / n$, where n is the number of observations, might be used.[2]

A conservative approach relies on that the Cook's distance has the form W/p, where W is formally identical to the Wald statistic that one uses for testing that $H_0{:}\beta_i = \beta_0$ using some $\hat{\beta}_{[-i]}$.[citation needed] Recalling that W/p has an $F_{p,n-p}$ distribution (with p and n-p degrees of freedom), we see that Cook's distance is equivalent to the F statistic for testing this hypothesis, and we can thus use $F_{p,n-p,1-\alpha}$ as a threshold.

d.f.	1	2	3	4	5	6	7	8	9	10	12	15	20	30	50	100	200	∞
1	0.106	0.281	0.373	0.425	0.459	0.482	0.499	0.513	0.523	0.531	0.544	0.556	0.569	0.582	0.593	0.601	0.605	0.609
2	0.083	0.250	0.346	0.405	0.443	0.469	0.489	0.505	0.517	0.527	0.542	0.557	0.573	0.589	0.602	0.611	0.616	0.621
3	0.077	0.241	0.341	0.402	0.444	0.473	0.495	0.512	0.526	0.537	0.554	0.572	0.590	0.608	0.623	0.635	0.640	0.646
4	0.073	0.236	0.338	0.403	0.446	0.478	0.502	0.520	0.535	0.547	0.565	0.585	0.604	0.625	0.642	0.655	0.661	0.668
5	0.071	0.233	0.337	0.404	0.449	0.482	0.507	0.526	0.542	0.555	0.575	0.595	0.617	0.639	0.657	0.671	0.679	0.686
6	0.070	0.232	0.337	0.404	0.451	0.485	0.511	0.531	0.548	0.561	0.582	0.604	0.627	0.650	0.670	0.685	0.693	0.701
7	0.069	0.230	0.336	0.405	0.453	0.488	0.514	0.535	0.552	0.566	0.588	0.611	0.635	0.660	0.681	0.697	0.706	0.714
8	0.069	0.229	0.336	0.406	0.454	0.490	0.517	0.539	0.556	0.571	0.593	0.617	0.642	0.668	0.690	0.707	0.716	0.725
9	0.068	0.229	0.336	0.406	0.455	0.492	0.519	0.542	0.559	0.574	0.598	0.622	0.648	0.675	0.698	0.716	0.726	0.735
10	0.068	0.228	0.336	0.407	0.456	0.493	0.521	0.544	0.562	0.578	0.601	0.626	0.653	0.681	0.705	0.724	0.734	0.744
15	0.067	0.226	0.335	0.408	0.460	0.498	0.528	0.552	0.572	0.588	0.614	0.642	0.671	0.703	0.731	0.753	0.765	0.777
20	0.066	0.226	0.335	0.409	0.462	0.501	0.532	0.557	0.577	0.594	0.622	0.651	0.682	0.717	0.747	0.772	0.785	0.799
30	0.065	0.225	0.335	0.410	0.464	0.504	0.536	0.562	0.583	0.601	0.630	0.661	0.695	0.733	0.767	0.796	0.811	0.828
40	0.065	0.224	0.335	0.410	0.465	0.506	0.539	0.565	0.587	0.605	0.635	0.667	0.702	0.742	0.779	0.810	0.827	0.846
50	0.065	0.224	0.335	0.411	0.466	0.507	0.540	0.567	0.589	0.607	0.638	0.670	0.707	0.749	0.787	0.820	0.839	0.860
100	0.065	0.224	0.335	0.411	0.467	0.509	0.543	0.570	**0.593**	0.613	0.644	0.678	0.717	0.762	0.805	0.845	0.868	0.895
200	0.064	0.223	0.335	0.412	0.468	0.511	0.544	0.572	0.595	0.615	0.647	0.683	0.723	0.770	0.816	0.860	0.888	0.923
∞	0.064	0.223	0.335	0.412	0.469	0.512	0.546	0.574	0.598	0.618	0.651	0.687	0.729	0.779	0.829	0.879	0.915	0.995

d.f.	1	2	3	4	5	6	7	8	9	10	12	15	20	30	50	100	200	∞
1	0.025	0.117	0.181	0.220	0.246	0.265	0.279	0.289	0.298	0.304	0.315	0.325	0.336	0.347	0.356	0.363	0.366	0.370
2	0.020	0.111	0.183	0.231	0.265	0.289	0.307	0.321	0.333	0.342	0.356	0.371	0.386	0.402	0.415	0.424	0.429	0.434
3	0.019	0.109	0.186	0.239	0.276	0.304	0.325	0.342	0.356	0.367	0.384	0.402	0.420	0.439	0.455	0.467	0.474	0.480
4	0.018	0.108	0.187	0.243	0.284	0.314	0.338	0.356	0.371	0.384	0.403	0.423	0.445	0.467	0.485	0.500	0.507	0.514
5	0.017	0.108	0.188	0.247	0.290	0.322	0.347	0.367	0.383	0.397	0.418	0.440	0.463	0.488	0.509	0.525	0.533	0.541
6	0.017	0.107	0.189	0.249	0.294	0.327	0.354	0.375	0.392	0.406	0.429	0.453	0.478	0.505	0.528	0.545	0.554	0.564
7	0.017	0.107	0.190	0.251	0.297	0.332	0.359	0.381	0.399	0.414	0.438	0.463	0.490	0.519	0.543	0.563	0.572	0.582
8	0.017	0.107	0.190	0.253	0.299	0.335	0.363	0.386	0.405	0.421	0.446	0.472	0.500	0.531	0.557	0.577	0.588	0.599
9	0.017	0.107	0.191	0.254	0.302	0.338	0.367	0.390	0.410	0.426	0.452	0.479	0.509	0.541	0.568	0.590	0.601	0.613
10	0.017	0.106	0.191	0.255	0.303	0.340	0.370	0.394	0.414	0.431	0.457	0.486	0.516	0.550	0.578	0.601	0.613	0.625
15	0.016	0.106	0.192	0.258	0.309	0.348	0.380	0.406	0.427	0.446	0.475	0.507	0.542	0.581	0.615	0.642	0.657	0.672
20	0.016	0.106	0.193	0.260	0.312	0.353	0.385	0.412	0.435	0.454	0.486	0.520	0.557	0.600	0.638	0.669	0.686	0.704
30	0.016	0.106	0.193	0.262	0.315	0.357	0.391	0.420	0.444	0.464	0.497	0.534	0.575	0.622	0.666	0.703	0.723	0.745
40	0.016	0.106	0.194	0.263	0.317	0.360	0.394	0.423	0.448	0.469	0.503	0.542	0.585	0.636	0.683	0.724	0.747	0.772
50	0.016	0.106	0.194	0.263	0.318	0.361	0.396	0.426	0.451	0.472	0.508	0.547	0.592	0.644	0.694	0.738	0.763	0.791
100	0.016	0.105	0.194	0.265	0.320	0.364	0.400	0.431	**0.457**	0.479	0.516	0.558	0.606	0.664	0.720	0.773	0.805	0.844
200	0.016	0.105	0.195	0.265	0.321	0.366	0.403	0.433	0.460	0.483	0.521	0.564	0.614	0.675	0.736	0.795	0.834	0.885
∞	0.016	0.105	0.195	0.266	0.322	0.367	0.405	0.436	0.463	0.487	0.525	0.570	0.622	0.687	0.754	0.824	0.874	0.992

F table : Probability of a larger F value = 0.500 (one tailed test)

d.f.	1	2	3	4	5	6	7	8	9	10	12	15	20	30	50	100	200	∞
1	1.000	1.500	1.709	1.823	1.894	1.942	1.977	2.004	2.025	2.042	2.067	2.093	2.12	2.15	2.17	2.18	2.19	2.20
2	0.667	1.000	1.135	1.207	1.252	1.282	1.305	1.321	1.334	1.345	1.361	1.377	1.39	1.41	1.42	1.43	1.44	1.44
3	0.585	0.881	1.000	1.063	1.102	1.129	1.148	1.163	1.174	1.183	1.197	1.211	1.23	1.24	1.25	1.26	1.26	1.27
4	0.549	0.828	0.941	1.000	1.037	1.062	1.080	1.093	1.104	1.113	1.126	1.139	1.15	1.16	1.18	1.18	1.19	1.19
5	0.528	0.799	0.907	0.965	1.000	1.024	1.041	1.055	1.065	1.073	1.085	1.098	1.11	1.12	1.13	1.14	1.15	1.15
6	0.515	0.780	0.886	0.942	0.977	1.000	1.017	1.030	1.040	1.048	1.060	1.072	1.08	1.10	1.11	1.11	1.12	1.12
7	0.506	0.767	0.871	0.926	0.960	0.983	1.000	1.013	1.022	1.030	1.042	1.054	1.07	1.08	1.09	1.10	1.10	1.10
8	0.499	0.757	0.860	0.915	0.948	0.971	0.988	1.000	1.010	1.018	1.029	1.041	1.05	1.07	1.07	1.08	1.09	1.09
9	0.494	0.749	0.852	0.906	0.939	0.962	0.978	0.990	1.000	1.008	1.019	1.031	1.04	1.05	1.06	1.07	1.08	1.08
10	0.490	0.743	0.845	0.899	0.932	0.954	0.971	0.983	0.992	1.000	1.012	1.023	1.03	1.05	1.06	1.06	1.07	1.07
12	0.484	0.735	0.835	0.888	0.921	0.943	0.959	0.972	0.981	0.989	1.000	1.012	1.02	1.03	1.04	1.05	1.05	1.06
15	0.478	0.726	0.826	0.878	0.911	0.933	0.949	0.960	0.970	0.977	0.989	1.000	1.01	1.02	1.03	1.04	1.04	1.05
20	0.472	0.718	0.816	0.868	0.900	0.922	0.938	0.950	0.959	0.966	0.977	0.989	1.00	1.01	1.02	1.03	1.03	1.03
30	0.466	0.709	0.807	0.858	0.890	0.912	0.927	0.939	0.948	0.955	0.966	0.978	0.99	1.00	1.01	1.02	1.02	1.02
50	0.462	0.703	0.800	0.851	0.882	0.903	0.919	0.930	0.940	0.947	0.958	0.969	0.98	0.99	1.00	1.01	1.01	1.01
100	0.458	0.698	0.794	0.845	0.876	0.897	0.913	**0.924**	0.933	0.940	0.951	0.962	0.97	0.98	0.99	1.00	1.00	1.01
∞	0.455	0.693	0.789	0.839	0.870	0.891	0.907	0.918	0.927	0.934	0.945	0.956	0.97	0.98	0.99	0.99	1.00	1.00

F table : Probability of a larger F value = 0.75 (one tailed test)

d.f.	1	2	3	4	5	6	7	8	9	10	12	15	20	30	50	100	200	∞
1	0.172	0.389	0.494	0.553	0.591	0.617	0.636	0.650	0.661	0.670	0.684	0.698	0.712	0.727	0.738	0.747	0.751	0.756
2	0.133	0.333	0.439	0.500	0.540	0.567	0.588	0.604	0.616	0.626	0.641	0.657	0.673	0.689	0.702	0.711	0.716	0.721
3	0.122	0.317	0.425	0.489	0.531	0.560	0.582	0.599	0.613	0.624	0.641	0.658	0.675	0.693	0.708	0.719	0.725	0.730
4	0.117	0.309	0.418	0.484	0.528	0.560	0.583	0.601	0.615	0.627	0.645	0.664	0.683	0.702	0.718	0.730	0.737	0.743
5	0.113	0.305	0.415	0.483	0.528	0.560	0.584	0.603	0.618	0.631	0.650	0.669	0.690	0.711	0.728	0.741	0.748	0.755
6	0.111	0.302	0.413	0.482	0.528	0.561	0.586	0.606	0.621	0.634	0.654	0.675	0.696	0.718	0.737	0.751	0.758	0.765
7	0.110	0.300	0.411	0.481	0.528	0.562	0.588	0.608	0.624	0.637	0.658	0.679	0.702	0.725	0.744	0.759	0.767	0.774
8	0.109	0.298	0.410	0.481	0.528	0.563	0.589	0.610	0.627	0.640	0.661	0.683	0.707	0.731	0.751	0.767	0.775	0.783
9	0.108	0.297	0.410	0.480	0.529	0.564	0.591	0.612	0.629	0.643	0.664	0.687	0.711	0.736	0.757	0.773	0.782	0.790
10	0.107	0.296	0.409	0.480	0.529	0.565	0.592	0.613	0.630	0.645	0.667	0.690	0.715	0.740	0.762	0.779	0.788	0.797
12	0.106	0.295	0.408	0.480	0.530	0.566	0.594	0.616	0.633	0.648	0.671	0.695	0.721	0.748	0.771	0.789	0.799	0.808
15	0.105	0.293	0.407	0.480	0.530	0.567	0.596	0.618	0.637	0.652	0.676	0.701	0.728	0.757	0.782	0.801	0.812	0.822
20	0.104	0.292	0.406	0.480	0.531	0.569	0.598	0.622	0.641	0.656	0.681	0.708	0.736	0.767	0.794	0.816	0.827	0.839
30	0.103	0.290	0.406	0.480	0.532	0.571	0.601	0.625	0.645	0.661	0.688	0.716	0.746	0.780	0.810	0.835	0.848	0.862
50	0.103	0.289	0.405	0.480	0.533	0.573	0.604	0.628	0.649	0.666	0.693	0.723	0.755	0.792	0.825	0.854	0.870	0.887
100	0.102	0.289	0.405	0.480	0.534	0.574	0.606	**0.631**	0.652	0.670	0.698	0.729	0.763	0.803	0.840	0.873	0.893	0.916
∞	0.102	0.288	0.404	0.481	0.535	0.576	0.608	0.634	0.655	0.674	0.703	0.736	0.772	0.816	0.859	0.901	0.930	0.987