

振動倍率係数 \mathfrak{B}/V の表について

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地震の験測を行う場合に振巾を求めるには振動倍率 V が必要であるが、振動倍率は振動倍率係数 \mathfrak{B}/V の表⁽¹⁾によるか、或はノモグラムに依つて求めねばならぬ。既に振動倍率を求めるノモグラム⁽²⁾も数種作製されていて、極めて簡単に求められ便利であるが、人によつては \mathfrak{B}/V の表より振動倍率曲線を作つておいて求めるのを好む人もある。観測法 p. 20 掲載の \mathfrak{B}/V の表は v , T/T_0 の間隔が粘く、且つ表中に二、三の誤りもあるので、之を修正の意味で再計算した。

一般に振動倍率 \mathfrak{B} は

$$\mathfrak{B} = \frac{V}{\sqrt{\left[\left(\frac{T}{T_0}\right)^2 - 1\right]^2 + 4\left(\frac{T_0}{2\pi\tau}\right)^2\left(\frac{T}{T_0}\right)^2}} \quad \text{p. 65 (20)}$$

であるが、この式と

$$T' = \frac{T_0}{\sqrt{1 - \left(\frac{T_0}{2\pi\tau}\right)^2}} \quad \text{p. 64 (12)}$$

$$v = e^{T'/2\tau} \quad \text{p. 64 (13)}$$

の 2 式より T' , τ を消去すると

$$\mathfrak{B} = \frac{V}{\sqrt{\left[\left(\frac{T}{T_0}\right)^2 - 1\right]^2 + 4\frac{(\log v)^2}{(\log v)^2 + \pi^2}\left(\frac{T}{T_0}\right)^2}}$$

となる。

従つてこの式に依り v , T/T_0 より \mathfrak{B}/V の表を作ることが出来るので、 v を 2.0~10.0 の範囲で 0.1 毎に、 T/T_0 を 0.1~2.1 の範囲で 0.1 毎について \mathfrak{B}/V の値を小数 3 位まで計算した。之が別表、振動倍率係数 \mathfrak{B}/V の表である。 (1949, V)

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(1) 地震観測法 (中央气象台 昭和 11 年 6 月刊行) 中の p. 20 掲載。以下本文中の頁、式は何れも同書中の頁、式を指す。

(2) 喜多村一男; 地震計の倍率を計算するノモグラフ。験震時報, 才 10 卷才 1 号, 昭和 12 年。
坂田勝藏; 地震に関する二、三のノモグラフ。海と空, 才 21 卷才 4 号, 昭和 16 年。
坂田勝茂; 振動倍率を求めるノモグラム。気象集誌, 才 27 卷才 3 号, 昭和 24 年。

別表 (その一) 振動倍率係数 \mathcal{B}/V の表

T/T_0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1
2.0	1.009	1.038	1.088	1.166	1.282	1.449	1.688	2.006	2.315	1.321	1.924	1.473	1.125	0.882	0.711	0.582	0.493	0.422	0.367	0.321	0.283
2.1	.009	.037	.086	.163	.275	.435	.658	1.943	.196	.175	.826	.417	.096	.865	.700	.573	.489	.419	.364	.319	.282
2.2	.009	.036	.085	.160	.268	.421	.630	.885	.094	.054	.739	.367	.068	.849	.690	.566	.485	.416	.361	.317	.281
2.3	.009	.036	.084	.157	.262	.408	.604	.833	.004	.951	.662	.322	.043	.834	.680	.560	.481	.413	.359	.315	.280
2.4	.009	.035	.082	.153	.255	.396	.578	.784	1.926	.863	.595	.282	.019	.820	.672	.553	.477	.410	.357	.314	.278
2.5	.008	.035	.081	.150	.249	.384	.554	.740	.856	.786	.537	.245	0.997	.807	.664	.547	.473	.407	.365	.312	.277
2.6	.008	.034	.079	.147	.243	.372	.532	.699	.795	.718	.484	.212	.977	.794	.656	.541	.469	.404	.353	.311	.276
2.7	.008	.034	.078	.144	.237	.360	.511	.662	.739	.659	.438	.181	.958	.782	.648	.536	.465	.402	.351	.309	.275
2.8	.008	.033	.076	.141	.231	.349	.490	.627	.689	.605	.395	.153	.940	.771	.641	.530	.461	.399	.349	.308	.274
2.9	.008	.032	.075	.138	.226	.339	.471	.594	.644	.557	.357	.127	.923	.760	.634	.525	.458	.397	.347	.306	.273
3.0	1.008	1.032	1.074	1.136	1.221	1.329	1.453	1.564	1.603	1.514	1.322	1.103	0.908	0.750	0.627	0.580	0.455	0.394	0.345	0.305	0.272
3.1	.008	.031	.072	.133	.215	.319	.436	.536	.565	.475	.286	.081	.894	.741	.621	.515	.452	.392	.344	.304	.271
3.2	.008	.031	.071	.130	.210	.309	.420	.511	.531	.440	.261	.061	.880	.732	.615	.511	.449	.390	.342	.302	.270
3.3	.008	.030	.070	.128	.205	.300	.404	.487	.499	.408	.236	.043	.867	.724	.609	.507	.446	.388	.340	.301	.269
3.4	.007	.030	.069	.125	.200	.292	.389	.463	.470	.378	.211	.025	.855	.715	.603	.503	.443	.386	.339	.300	.268
3.5	.007	.029	.068	.123	.195	.283	.375	.442	.443	.350	.188	.008	.844	.705	.598	.499	.440	.384	.337	.299	.267
3.6	.007	.029	.066	.120	.191	.275	.361	.422	.417	.324	.167	0.993	.833	.700	.593	.495	.438	.382	.336	.298	.266
3.7	.007	.029	.065	.118	.186	.268	.349	.403	.394	.301	.148	.978	.823	.693	.588	.491	.435	.380	.334	.297	.265
3.8	.007	.028	.064	.116	.182	.260	.337	.385	.372	.278	.129	.464	.814	.687	.583	.488	.433	.378	.333	.296	.264
3.9	.007	.028	.063	.113	.178	.253	.325	.369	.352	.258	.112	.932	.805	.680	.579	.484	.430	.376	.332	.294	.263
4.0	1.007	1.027	1.062	1.111	1.174	1.246	1.314	1.352	1.232	1.239	1.096	0.940	0.796	0.674	0.575	0.481	0.428	0.375	0.330	0.293	0.263
4.1	.007	.027	.061	.109	.170	.239	.303	.337	.213	.220	.081	.929	.788	.668	.571	.478	.426	.373	.329	.292	.262
4.2	.007	.026	.060	.107	.166	.233	.293	.323	.496	.203	.066	.918	.780	.663	.567	.475	.424	.371	.328	.292	.261
4.3	.006	.026	.059	.105	.163	.226	.283	.309	.279	.187	.052	.907	.772	.657	.563	.472	.422	.370	.327	.291	.260
4.4	.006	.026	.058	.103	.159	.220	.273	.296	.264	.172	.040	.897	.765	.652	.559	.469	.420	.368	.325	.290	.260
4.5	.006	.025	.057	.101	.156	.214	.264	.284	.250	.158	.028	.888	.759	.648	.556	.467	.418	.367	.324	.289	.259
4.6	.006	.025	.056	.099	.152	.209	.256	.272	.236	.144	.016	.879	.752	.643	.552	.464	.416	.365	.323	.288	.258
4.7	.006	.024	.055	.097	.149	.203	.247	.261	.222	.131	.005	.871	.746	.639	.549	.462	.414	.364	.322	.287	.258
4.8	.006	.024	.054	.095	.145	.198	.239	.249	.210	.119	0.995	.863	.740	.634	.546	.460	.412	.363	.321	.286	.257
4.9	.006	.024	.053	.094	.142	.193	.232	.239	.198	.108	.985	.855	.735	.630	.543	.457	.411	.361	.320	.286	.256
5.0	1.006	1.023	1.053	1.092	1.139	1.188	1.224	1.229	1.187	1.097	0.976	0.848	0.729	0.626	0.540	0.455	0.409	0.360	0.319	0.285	0.256
5.1	.006	.023	.052	.090	.136	.183	.217	.220	.176	.086	.967	.841	.724	.622	.537	.452	.407	.359	.318	.284	.255
5.2	.006	.023	.051	.089	.133	.178	.210	.211	.166	.076	.958	.834	.719	.618	.534	.450	.406	.358	.317	.283	.255
5.3	.006	.022	.050	.087	.131	.173	.203	.202	.156	.066	.950	1828	.714	.615	.531	.448	.404	.357	.316	.283	.254
5.4	.006	.022	.049	.085	.128	.169	.196	.193	.146	.057	.943	.822	.709	.611	.529	.446	.403	.355	.316	.282	.253
5.5	.005	.022	.048	.084	.125	.165	.190	.185	.137	.048	.935	.816	.705	.608	.526	.444	.402	.354	.315	.281	.253
5.6	.005	.021	.047	.082	.122	.161	.184	.177	.128	.040	.928	.810	.700	.605	.524	.442	.400	.353	.314	.281	.252
5.7	.005	.021	.047	.081	.120	.156	.178	.170	.120	.032	.920	.804	.696	.601	.521	.441	.394	.352	.313	.280	.252
5.8	.005	.021	.046	.079	.117	.152	.172	.163	.112	.024	.913	.799	.690	.598	.519	.439	.397	.351	.312	.279	.251
5.9	.005	.021	.045	.078	.115	.148	.167	.156	.104	.016	.907	.794	.687	.596	.517	.437	.396	.350	.312	.279	.251

別 表-(その二)

T/T_0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1
6.0	1.005	1.020	1.045	1.077	1.112	1.144	1.161	1.149	1.097	1.009	0.901	0.789	0.684	0.593	0.515	0.436	0.395	0.349	0.311	0.278	0.250
6.1	.005	.020	.044	.075	.110	.141	.156	.142	.087	.002	.894	.784	.681	.590	.513	.434	.394	.348	.310	.278	.250
6.2	.005	.020	.043	.074	.108	.138	.151	.135	.082	0.996	.839	.779	.677	.587	.511	.432	.393	.347	.309	.277	.249
6.3	.005	.019	.043	.073	.106	.134	.146	.129	.076	.989	.883	.775	.673	.584	.509	.430	.391	.347	.309	.276	.249
6.4	.005	.019	.042	.071	.103	.130	.141	.123	.069	.982	.878	.770	.670	.582	.507	.429	.390	.346	.308	.276	.248
6.5	.005	.019	.041	.070	.101	.127	.137	.118	.063	.977	.873	.766	.667	.580	.505	.428	.389	.345	.307	.275	.248
6.6	.005	.019	.041	.069	.099	.124	.133	.112	.057	.971	.868	.762	.664	.577	.503	.426	.388	.344	.307	.275	.248
6.7	.005	.018	.040	.068	.097	.121	.128	.107	.051	.965	.864	.758	.661	.575	.502	.425	.387	.343	.306	.274	.247
6.8	.005	.018	.035	.066	.095	.118	.124	.101	.045	.960	.858	.755	.658	.573	.500	.424	.386	.342	.305	.274	.247
6.9	.005	.018	.039	.065	.093	.115	.120	.096	.040	.954	.854	.751	.655	.570	.498	.422	.385	.342	.305	.273	.246
7.0	1.004	1.017	1.038	1.064	1.091	1.112	1.116	1.091	1.034	0.950	0.850	0.747	0.652	0.568	0.497	0.421	0.384	0.341	0.304	0.273	0.246
7.1	.004	.017	.038	.063	.089	.109	.112	.087	.029	.944	.845	.744	.650	.566	.495	.420	.383	.340	.304	.272	.246
7.2	.004	.017	.037	.062	.087	.106	.108	.082	.024	.940	.841	.740	.647	.564	.493	.419	.382	.339	.303	.272	.245
7.3	.004	.017	.036	.061	.086	.103	.104	.077	.019	.935	.837	.737	.644	.562	.492	.417	.381	.339	.302	.272	.245
7.4	.004	.016	.036	.060	.084	.101	.100	.073	.014	.930	.833	.734	.642	.560	.490	.416	.380	.338	.302	.271	.245
7.5	.004	.016	.035	.059	.082	.098	.097	.069	.010	.926	.829	.731	.639	.558	.489	.415	.380	.337	.301	.271	.244
7.6	.004	.016	.035	.058	.080	.096	.093	.064	.006	.922	.825	.728	.637	.556	.487	.414	.379	.336	.301	.270	.244
7.7	.004	.016	.034	.057	.079	.093	.090	.060	.001	.918	.822	.725	.635	.555	.486	.413	.378	.336	.300	.270	.244
7.8	.004	.016	.034	.056	.077	.091	.087	.056	0.997	.914	.818	.722	.633	.553	.485	.412	.377	.335	.300	.269	.243
7.9	.004	.015	.033	.055	.076	.088	.083	.052	.993	.910	.815	.719	.630	.551	.483	.411	.376	.335	.299	.269	.243
8.0	1.004	1.015	1.033	1.054	1.074	1.086	1.080	1.048	0.998	0.906	0.811	0.716	0.628	0.549	0.482	0.410	0.375	0.334	0.299	0.268	0.243
8.1	.004	.015	.032	.053	.073	.083	.077	.045	.985	.902	.808	.714	.626	.548	.481	.409	.375	.333	.298	.268	.242
8.2	.004	.015	.032	.052	.071	.081	.074	.041	.981	.898	.805	.711	.624	.546	.480	.408	.374	.333	.298	.268	.242
8.3	.004	.015	.031	.051	.069	.089	.071	.038	.978	.895	.802	.709	.622	.545	.478	.407	.373	.332	.297	.267	.242
8.4	.004	.014	.031	.050	.068	.077	.068	.034	.974	.891	.799	.706	.620	.543	.477	.406	.372	.332	.297	.267	.241
8.5	.004	.014	.030	.049	.066	.075	.065	.031	.970	.888	.796	.704	.618	.542	.476	.405	.372	.331	.296	.267	.241
8.6	.004	.014	.030	.048	.065	.072	.062	.028	.966	.885	.793	.701	.616	.540	.475	.404	.371	.330	.296	.266	.241
8.7	.004	.014	.029	.047	.063	.070	.059	.024	.962	.882	.790	.699	.614	.539	.474	.403	.370	.330	.295	.266	.240
8.8	.004	.014	.029	.047	.062	.068	.057	.021	.959	.879	.787	.697	.612	.537	.473	.402	.370	.329	.295	.266	.240
8.9	.004	.013	.028	.046	.061	.066	.054	.018	.956	.876	.785	.695	.611	.536	.471	.401	.369	.329	.295	.255	.240
9.0	1.003	1.013	1.028	1.045	1.059	1.065	1.052	1.015	0.953	0.873	0.782	0.693	0.609	0.535	0.470	0.401	0.368	0.328	0.294	0.265	0.240
9.1	.003	.013	.028	.044	.058	.063	.049	.012	.950	.870	.780	.691	.607	.533	.469	.400	.368	.328	.294	.265	.239
9.2	.003	.013	.027	.043	.057	.061	.047	.009	.947	.867	.777	.688	.606	.532	.468	.399	.367	.327	.293	.264	.239
9.3	.003	.013	.027	.042	.056	.059	.044	.006	.944	.864	.775	.686	.604	.531	.467	.398	.366	.327	.293	.264	.239
9.4	.003	.012	.026	.042	.054	.057	.042	.003	.941	.861	.772	.684	.602	.530	.466	.397	.366	.326	.293	.264	.238
9.5	.003	.012	.026	.041	.053	.055	.040	.000	.938	.858	.770	.682	.601	.528	.465	.397	.365	.326	.292	.263	.238
9.6	.003	.012	.025	.040	.052	.053	.037	0.997	.935	.855	.768	.680	.599	.527	.464	.396	.365	.325	.292	.263	.238
9.7	.003	.012	.025	.040	.051	.052	.035	.995	.933	.853	.766	.679	.598	.526	.464	.395	.364	.325	.291	.263	.238
9.8	.003	.012	.025	.039	.050	.050	.033	.993	.930	.850	.763	.677	.596	.525	.463	.394	.364	.325	.291	.262	.238
9.9	.003	.012	.024	.038	.048	.048	.031	.990	.928	.848	.761	.675	.595	.524	.462	.393	.363	.324	.291	.262	.237
10.0	.003	.011	.024	.037	.047	.047	.029	.988	.925	.846	.759	.673	.593	.522	.461	.393	.362	.324	.290	.262	.237

振動伝率係数 R/V の表について——坂田