

# APPENDIX E

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## Hirschmann-Brauweiler Tables

The Hirschmann-Brauweiler Tables may be used for discounting or compounding cash flows, although the tables indicate discounting. These tables are divided into three sections depending upon how the cash flows: instantaneously, uniformly, or years digits. The last section was originally developed when sum-of-years depreciation was allowable. It is still used for cash flows declining to zero uniformly over a time period.

The factors are used to discount cash flows back to time zero continuously. To enter the tables, an argument  $R \times T$  must first be calculated, where  $R$  is the interest rate expressed as a whole number and  $T$  is the time in years. For example, if a cash flow of \$1000 occurs uniformly over a 2-year period at 15% interest, the discounted cash flow is calculated as follows:

Enter the uniform table with the argument of  $R \times T = 15 \times 2 = 3$  and the factor is 0.8639. Therefore the discounted cash flow is  $\$1000 \times 0.8639 = \$863.90$ .

These tables may also be used for compounding as mentioned previously. In this case, the factor used is the reciprocal of  $R \times T$  from the compounding table. For example, the factor for a cash flow that occurs instantaneously 2 years prior to time zero at 20% interest is  $R \times T$  from the instantaneous table, or  $20 \times 2 = 40$ . From that table, the factor is 0.6703. But since the cash flow occurs 2 years prior to time zero, the reciprocal of the factor is  $1/0.6703 = 1.4919$ . For example, a cash flow of \$5000 that occurs instantaneously 2 years prior to time zero at 20% interest is  $\$5000 \times (1/0.6703) = \$7459.35$ , which is the compound amount of that cash flow.

In using the table, one must select the correct cash flow model.

## Hirschmann-Brauweiler Tables

## FACTORS FOR CONTINUOUS DISCOUNTING: UNIFORM

$R \times T$	0	1	2	3	4	5	6	7	8	9
0	1.0000	.9950	.9901	.9851	.9803	.9754	.9706	.9658	.9610	.9563
10	.9516	.9470	.9423	.9377	.9332	.9286	.9241	.9196	.9152	.9107
20	.9063	.9020	.8976	.8933	.8891	.8848	.8806	.8764	.8722	.8681
30	.8639	.8598	.8558	.8517	.8477	.8437	.8398	.8359	.8319	.8281
40	.8242	.8204	.8166	.8128	.8090	.8053	.8016	.7979	.7942	.7906
50	.7869	.7833	.7798	.7762	.7727	.7692	.7657	.7622	.7588	.7554
60	.7520	.7486	.7453	.7419	.7386	.7353	.7320	.7288	.7256	.7224
70	.7192	.7160	.7128	.7097	.7066	.7035	.7004	.6974	.6944	.6913
80	.6883	.6854	.6824	.6795	.6765	.6736	.6707	.6679	.6650	.6622
90	.6594	.6566	.6538	.6510	.6483	.6455	.6428	.6401	.6374	.6348
100	.6321	.6295	.6269	.6243	.6217	.6191	.6166	.6140	.6115	.6090
110	.6065	.6040	.6015	.5991	.5967	.5942	.5918	.5894	.5871	.5847
120	.5823	.5800	.5777	.5754	.5731	.5708	.5685	.5663	.5640	.5618
130	.5596	.5574	.5552	.5530	.5509	.5487	.5466	.5444	.5423	.5402
140	.5381	.5361	.5340	.5320	.5299	.5279	.5259	.5239	.5219	.5199
150	.5179	.5160	.5140	.5121	.5101	.5082	.5063	.5044	.5025	.5007
160	.4988	.4970	.4951	.4933	.4915	.4897	.4879	.4861	.4843	.4825
170	.4808	.4790	.4773	.4756	.4738	.4721	.4704	.4687	.4671	.4654
180	.4637	.4621	.4604	.4588	.4572	.4555	.4539	.4523	.4507	.4492
190	.4476	.4460	.4445	.4429	.4414	.4399	.4383	.4368	.4353	.4338
200	.4323	.4309	.4294	.4279	.4265	.4250	.4236	.4221	.4207	.4193
210	.4179	.4165	.4151	.4137	.4123	.4109	.4096	.4082	.4069	.4055
220	.4042	.4029	.4015	.4002	.3989	.3976	.3963	.3950	.3937	.3925
230	.3912	.3899	.3887	.3874	.3862	.3849	.3837	.3825	.3813	.3801
240	.3789	.3777	.3765	.3753	.3741	.3729	.3718	.3706	.3695	.3683
250	.3672	.3660	.3649	.3638	.3627	.3615	.3604	.3593	.3582	.3571
260	.3560	.3550	.3539	.3528	.3518	.3507	.3496	.3486	.3476	.3465
270	.3455	.3445	.3434	.3424	.3414	.3404	.3394	.3384	.3374	.3364
280	.3354	.3344	.3335	.3325	.3315	.3306	.3296	.3287	.3277	.3268
290	.3259	.3249	.3240	.3231	.3222	.3212	.3203	.3194	.3185	.3176
300	.3167	.3158	.3150	.3141	.3132	.3123	.3115	.3106	.3098	.3089
310	.3080	.3072	.3064	.3055	.3047	.3039	.3030	.3022	.3014	.3006
320	.2998	.2990	.2982	.2974	.2966	.2958	.2950	.2942	.2934	.2926
330	.2919	.2911	.2903	.2896	.2888	.2880	.2873	.2865	.2858	.2850
340	.2843	.2836	.2828	.2821	.2814	.2807	.2799	.2792	.2785	.2778
350	.2771	.2764	.2757	.2750	.2743	.2736	.2729	.2722	.2715	.2709
360	.2702	.2695	.2688	.2682	.2675	.2669	.2662	.2655	.2649	.2642
370	.2636	.2629	.2623	.2617	.2610	.2604	.2598	.2591	.2585	.2579
380	.2573	.2567	.2560	.2554	.2548	.2542	.2536	.2530	.2524	.2518
390	.2512	.2506	.2500	.2495	.2489	.2483	.2477	.2471	.2466	.2460
400	.2454	.2449	.2443	.2437	.2432	.2426	.2421	.2415	.2410	.2404
410	.2399	.2393	.2388	.2382	.2377	.2372	.2366	.2361	.2356	.2350
420	.2345	.2340	.2335	.2330	.2325	.2319	.2314	.2309	.2304	.2299
430	.2294	.2289	.2284	.2279	.2274	.2269	.2264	.2259	.2255	.2250
440	.2245	.2240	.2235	.2230	.2226	.2221	.2216	.2212	.2207	.2202
450	.2198	.2193	.2188	.2184	.2179	.2175	.2170	.2166	.2161	.2157
460	.2152	.2148	.2143	.2139	.2134	.2130	.2126	.2121	.2117	.2113
470	.2108	.2104	.2100	.2096	.2091	.2087	.2083	.2079	.2074	.2070
480	.2066	.2062	.2058	.2054	.2050	.2046	.2042	.2038	.2034	.2030
490	.2026	.2022	.2018	.2014	.2010	.2006	.2002	.1998	.1994	.1990
500	.1987	.1983	.1979	.1975	.1971	.1967	.1963	.1959	.1955	.1951

## Mirschmann-Brauweiler Tables

## FACTORS FOR CONTINUOUS DISCOUNTING: INSTANTANEOUS

$R \times T$	0	1	2	3	4	5	6	7	8	9
0	1.0000	.9900	.9802	.9704	.9608	.9512	.9418	.9324	.9231	.9139
10	.9048	.8958	.8869	.8781	.8694	.8607	.8521	.8437	.8353	.8270
20	.8187	.8106	.8025	.7945	.7866	.7788	.7711	.7634	.7558	.7483
30	.7408	.7334	.7261	.7189	.7118	.7047	.6977	.6907	.6839	.6771
40	.6703	.6637	.6570	.6505	.6440	.6376	.6313	.6250	.6188	.6126
50	.6065	.6005	.5945	.5886	.5827	.5769	.5712	.5655	.5599	.5543
60	.5488	.5434	.5379	.5326	.5273	.5220	.5169	.5117	.5066	.5016
70	.4966	.4916	.4868	.4819	.4771	.4724	.4677	.4630	.4584	.4538
80	.4493	.4449	.4404	.4360	.4317	.4274	.4232	.4190	.4148	.4107
90	.4066	.4025	.3985	.3946	.3906	.3867	.3829	.3791	.3753	.3716
100	.3679	.3642	.3606	.3570	.3535	.3499	.3465	.3430	.3396	.3362
110	.3329	.3296	.3263	.3230	.3198	.3166	.3135	.3104	.3073	.3042
120	.3012	.2982	.2952	.2923	.2894	.2865	.2837	.2808	.2780	.2753
130	.2725	.2698	.2671	.2645	.2618	.2592	.2567	.2541	.2516	.2491
140	.2466	.2441	.2417	.2393	.2369	.2346	.2322	.2299	.2276	.2254
150	.2231	.2209	.2187	.2165	.2144	.2122	.2101	.2080	.2060	.2039
160	.2019	.1999	.1979	.1959	.1940	.1920	.1901	.1882	.1864	.1845
170	.1827	.1809	.1791	.1773	.1755	.1738	.1720	.1703	.1686	.1670
180	.1653	.1637	.1620	.1604	.1588	.1572	.1557	.1541	.1526	.1511
190	.1496	.1481	.1466	.1451	.1437	.1423	.1409	.1395	.1381	.1367
200	.1353	.1340	.1327	.1313	.1300	.1287	.1275	.1262	.1249	.1237
210	.1225	.1212	.1200	.1188	.1177	.1165	.1153	.1142	.1130	.1119
220	.1108	.1097	.1086	.1075	.1065	.1054	.1044	.1033	.1023	.1013
230	.1003	.0993	.0983	.0973	.0963	.0954	.0944	.0935	.0926	.0916
240	.0907	.0898	.0889	.0880	.0872	.0863	.0854	.0846	.0837	.0829
250	.0821	.0813	.0805	.0797	.0789	.0781	.0773	.0765	.0758	.0750
260	.0743	.0735	.0728	.0721	.0714	.0707	.0699	.0693	.0686	.0679
270	.0672	.0665	.0659	.0652	.0646	.0639	.0633	.0627	.0620	.0614
280	.0608	.0602	.0596	.0590	.0584	.0578	.0573	.0567	.0561	.0556
290	.0550	.0545	.0539	.0534	.0529	.0523	.0518	.0513	.0508	.0503
300	.0498	.0493	.0488	.0483	.0478	.0474	.0469	.0464	.0460	.0455
310	.0450	.0446	.0442	.0437	.0433	.0429	.0424	.0420	.0416	.0412
320	.0408	.0404	.0400	.0396	.0392	.0388	.0384	.0380	.0376	.0373
330	.0369	.0365	.0362	.0358	.0354	.0351	.0347	.0344	.0340	.0337
340	.0334	.0330	.0327	.0324	.0321	.0317	.0314	.0311	.0308	.0305
350	.0302	.0299	.0296	.0293	.0290	.0287	.0284	.0282	.0279	.0276
360	.0273	.0271	.0268	.0265	.0263	.0260	.0257	.0255	.0252	.0250
370	.0247	.0245	.0242	.0240	.0238	.0235	.0233	.0231	.0228	.0226
380	.0224	.0221	.0219	.0217	.0215	.0213	.0211	.0209	.0207	.0204
390	.0202	.0200	.0198	.0196	.0194	.0193	.0191	.0189	.0187	.0185
400	.0183	.0181	.0180	.0178	.0176	.0174	.0172	.0171	.0169	.0167
410	.0166	.0164	.0162	.0161	.0159	.0158	.0156	.0155	.0153	.0151
420	.0150	.0148	.0147	.0146	.0144	.0143	.0141	.0140	.0138	.0137
430	.0136	.0134	.0133	.0132	.0130	.0129	.0128	.0127	.0125	.0124
440	.0123	.0122	.0120	.0119	.0118	.0117	.0116	.0114	.0113	.0112
450	.0111	.0110	.0109	.0108	.0107	.0106	.0105	.0104	.0103	.0102
460	.0101	.0100	.0099	.0098	.0097	.0096	.0095	.0094	.0093	.0092
470	.0091	.0090	.0089	.0088	.0087	.0087	.0086	.0085	.0084	.0083
480	.0082	.0081	.0081	.0080	.0079	.0078	.0078	.0077	.0076	.0075
490	.0074	.0074	.0073	.0072	.0072	.0071	.0070	.0069	.0069	.0068
500	.0067	.0067	.0065	.0065	.0064	.0064	.0063	.0063	.0062	.0062

## Hirschmann-Brauweiler Tables

## FACTORS FOR CONTINUOUS DISCOUNTING: YEARS-DIGITS

$R \times T$	0	1	2	3	4	5	6	7	8	9
0	1.0000	.9968	.9934	.9902	.9867	.9836	.9803	.9771	.9739	.9707
10	.9675	.9643	.9612	.9580	.9549	.9518	.9487	.9457	.9426	.9396
20	.9365	.9335	.9305	.9275	.9246	.9216	.9187	.9158	.9129	.9100
30	.9071	.9042	.9013	.8985	.8957	.8929	.8901	.8873	.8845	.8817
40	.8790	.8763	.8735	.8708	.8681	.8655	.8628	.8601	.8575	.8549
50	.8522	.8496	.8470	.8445	.8419	.8393	.8368	.8343	.8317	.8292
60	.8267	.8242	.8218	.8193	.8169	.8144	.8120	.8096	.8072	.8048
70	.8024	.8000	.7977	.7953	.7930	.7906	.7883	.7860	.7837	.7814
80	.7792	.7769	.7746	.7724	.7702	.7679	.7657	.7635	.7613	.7591
90	.7570	.7548	.7526	.7505	.7484	.7462	.7441	.7420	.7399	.7378
100	.7358	.7337	.7316	.7296	.7275	.7255	.7235	.7215	.7195	.7175
110	.7155	.7135	.7115	.7096	.7076	.7057	.7038	.7018	.6999	.6980
120	.6961	.6942	.6923	.6905	.6886	.6867	.6849	.6830	.6812	.6794
130	.6776	.6757	.6739	.6721	.6704	.6686	.6668	.6650	.6633	.6615
140	.6598	.6581	.6563	.6546	.6529	.6512	.6495	.6478	.6461	.6445
150	.6428	.6411	.6395	.6378	.6362	.6345	.6329	.6313	.6297	.6281
160	.6265	.6249	.6233	.6217	.6202	.6186	.6170	.6155	.6139	.6124
170	.6109	.6093	.6078	.6063	.6048	.6033	.6018	.6003	.5988	.5973
180	.5959	.5944	.5929	.5915	.5900	.5886	.5872	.5857	.5843	.5829
190	.5815	.5801	.5787	.5773	.5759	.5745	.5731	.5718	.5704	.5690
200	.5677	.5663	.5650	.5636	.5623	.5610	.5596	.5583	.5570	.5557
210	.5544	.5531	.5518	.5505	.5492	.5480	.5467	.5454	.5442	.5429
220	.5417	.5404	.5392	.5379	.5367	.5355	.5342	.5330	.5318	.5306
230	.5294	.5282	.5270	.5258	.5246	.5234	.5223	.5211	.5199	.5188
240	.5176	.5165	.5153	.5142	.5130	.5119	.5108	.5096	.5085	.5074
250	.5063	.5052	.5041	.5029	.5018	.5008	.4997	.4986	.4975	.4964
260	.4953	.4943	.4932	.4922	.4911	.4900	.4890	.4879	.4869	.4859
270	.4848	.4838	.4828	.4818	.4807	.4797	.4787	.4777	.4767	.4757
280	.4747	.4737	.4727	.4717	.4707	.4698	.4688	.4678	.4669	.4659
290	.4649	.4640	.4630	.4621	.4611	.4602	.4592	.4583	.4574	.4564
300	.4555	.4546	.4537	.4527	.4518	.4509	.4500	.4491	.4482	.4473
310	.4464	.4455	.4446	.4438	.4429	.4420	.4411	.4402	.4394	.4385
320	.4376	.4368	.4359	.4351	.4342	.4334	.4325	.4317	.4308	.4300
330	.4292	.4283	.4275	.4267	.4259	.4251	.4242	.4234	.4226	.4218
340	.4210	.4202	.4194	.4186	.4178	.4170	.4162	.4154	.4147	.4139
350	.4131	.4123	.4115	.4108	.4100	.4092	.4085	.4077	.4070	.4062
360	.4055	.4047	.4040	.4032	.4025	.4017	.4010	.4003	.3995	.3988
370	.3981	.3973	.3966	.3959	.3952	.3945	.3937	.3930	.3923	.3916
380	.3909	.3902	.3895	.3888	.3881	.3874	.3867	.3860	.3854	.3847
390	.3840	.3833	.3826	.3820	.3813	.3806	.3799	.3793	.3786	.3779
400	.3773	.3766	.3760	.3753	.3747	.3740	.3734	.3727	.3721	.3714
410	.3708	.3702	.3695	.3689	.3683	.3676	.3670	.3664	.3658	.3651
420	.3645	.3639	.3633	.3627	.3621	.3614	.3608	.3602	.3596	.3590
430	.3584	.3578	.3572	.3566	.3560	.3554	.3548	.3543	.3537	.3531
440	.3525	.3519	.3513	.3508	.3502	.3496	.3490	.3485	.3479	.3473
450	.3468	.3462	.3457	.3451	.3445	.3440	.3434	.3429	.3423	.3418
460	.3412	.3407	.3401	.3396	.3390	.3385	.3380	.3374	.3369	.3363
470	.3358	.3353	.3348	.3342	.3337	.3332	.3327	.3321	.3316	.3311
480	.3306	.3301	.3295	.3290	.3285	.3280	.3275	.3270	.3265	.3260
490	.3255	.3250	.3245	.3240	.3235	.3230	.3225	.3220	.3215	.3210
500	.3205	.3157	.3111	.3065	.3021	.2978	.2936	.2895	.2856	.2817