

```
1 // Dennis G. Zill "Differential Equations with Boundary-Value
2 // Problems 9th Edition" Page 322 Example 1
3 using System;
4 using Matrix_0;
5
6 namespace ConsoleApp41
7 {
8     internal class Program
9     {
10         static void Main(string[] args)
11         {
12             // 初始值
13             double[,] y0Start = { { 1 }, { -1 }, { 0 }, { 0 } };
14
15             // 由M, K, C矩陣, 建構系統矩陣A。
16             double[,] M = { { 1, 0 }, { 0, 1 } };
17             double[,] K = { { 10, -4 }, { -4, 4 } };
18             double[,] C = { { 0, 0 }, { 0, 0 } };
19             MKCMatrix MKC = new MKCMatrix(M, K, C);
20             ReMatrix A = new ReMatrix(MKC.Matrix);
21
22             // 系統與狀態參數(矩陣D、矩陣Q、和係數向量d)
23             // 特徵值D與特徵向量Q。
24             EIG eig = new EIG(A);
25             CxMatrix D = eig.CxMatrixD;
26             CxMatrix V = eig.CxVector;
27             CxMatrix Q = eig.CxMatrixQ;
28             // 係數向量d
29             CxToHexp Hexp = new CxToHexp(D, Q, 0);
30             CxMatrix MatTemp = Hexp.GetCxMatrix;
31             CxMatrix d = ~MatTemp * y0Start;
32
33             // 列印標題。
34             Console.WriteLine("\n****{0,6}系{0,5}統{0,5}與{0,5}狀{0,5}態{0,5}參  ➤
35                 {0,5}數{0,6}****\n", "");
36
37             // 列印系統與狀態參數。
38             Console.WriteLine("\n***{0,5}系統特徵值V{0,5}***\n{1}\n", "", new PR ➤
39                 (V));
40             Console.WriteLine("\n***{0,5}系統特徵向量Q{0,5}***\n{1}\n", "", new PR ➤
41                 (Q));
42             Console.WriteLine("\n***{0,5}係數向量d{0,5}***\n{1}\n", "", new PR ➤
43                 (d));
44
45             double step = 0.25;
```

```
42     int iRow = (int)(20 / step + 1);
43     int iCol = M.GetLength(1) + 1;
44     ReMatrix Disp = new ReMatrix(iRow, iCol);
45     ReMatrix Vel = new ReMatrix(iRow, iCol);
46     ReMatrix Acc = new ReMatrix(iRow, iCol);
47
48     for (int i = 0; i != iRow; i++)
49     {
50         double t = step * i;
51
52         Hexp = new CxToHexp(D, Q, t);
53         MatTemp = Hexp.GetCxMatrix;
54         ReMatrix yh_Re = (ReMatrix)(MatTemp * d);
55         ReMatrix yhDot_Re = A * yh_Re;
56
57         Acc.Matrix[i, 0] = t;
58         Acc.Matrix[i, 1] = yhDot_Re.Matrix[0, 0];
59         Acc.Matrix[i, 2] = yhDot_Re.Matrix[1, 0];
60
61         Vel.Matrix[i, 0] = t;
62         Vel.Matrix[i, 1] = yh_Re.Matrix[0, 0];
63         Vel.Matrix[i, 2] = yh_Re.Matrix[1, 0];
64
65         Disp.Matrix[i, 0] = t;
66         Disp.Matrix[i, 1] = yh_Re.Matrix[2, 0];
67         Disp.Matrix[i, 2] = yh_Re.Matrix[3, 0];
68     }
69
70     // 列印狀態響應(空間節點之變位, 速度, 和加速)。
71     Console.WriteLine("\n****{0,6}空{0,5}間{0,5}狀{0,5}態{0,5}響{0,5}應  ➤
       {0,6}****\n", "");
72
73     Console.WriteLine("\n{0,5}***位移反應量***{0,5}\n{0,8}時間(秒)" +
74         "{0,8}第0點位移{0,8}第1點位移\n\n{1}", "", new PR(Disp));
75     Console.WriteLine("\n{0,5}***速度反應量***{0,5}\n{0,8}時間(秒)" +
76         "{0,8}第0點速度{0,8}第1點速度\n\n{1}", "", new PR(Vel));
77     Console.WriteLine("\n****{0,5}加速度反應量{0,5}***\n{0,8}時間(秒)" +
78         "{0,8}第0點加速度{0,7}第1點加速度\n\n{1}", "", new PR(Acc));
79
80     // 以上的輸出方式可作為Excel繪圖, 以下的輸出方式可作為Matplotlib ➤
       繪圖。
81
82     // 列印時間、節點變位、速度、和加速度等序列。
83     Console.WriteLine("\n時間序列 : \n{0}\n", new PR4(Disp, 0, ➤
       "{0,8:F2}"));
```

```

84     Console.Write("\n第0點變位序列 : \n{0}\n", new PR4(Disp, 0));
85     Console.Write("\n第1點變位序列 : \n{0}\n", new PR4(Disp, 0));
86     Console.Write("\n第0點速度序列 : \n{0}\n", new PR4(Vel, 0));
87     Console.Write("\n第1點速度序列 : \n{0}\n", new PR4(Vel, 0));
88     Console.Write("\n\n");
89
90     }
91 }
92 }
93
94 /*
95 ****      系      統      與      狀      態      參      數      ****
96
97 ***      系統特徵值V      ***
98     0.00000 + 3.46410i
99     0.00000 - 3.46410i
100    0.00000 + 1.41421i
101    0.00000 - 1.41421i
102
103 ***      系統特徵向量Q      ***
104    0.85934 + 0.00000i, 0.85934 + 0.00000i,
105    0.36515 + 0.00000i, 0.36515 + 0.00000i
106
107   -0.42967 + 0.00000i, -0.42967 + 0.00000i,
108    0.73030 + 0.00000i, 0.73030 + 0.00000i
109
110    0.00000 - 0.24807i, 0.00000 + 0.24807i,
111    0.00000 - 0.25820i, 0.00000 + 0.25820i
112
113    0.00000 + 0.12403i, 0.00000 - 0.12403i,
114    0.00000 - 0.51640i, 0.00000 + 0.51640i
115
116 ***      係數向量d      ***
117    0.69821 + 0.00000i
118    0.69821 + 0.00000i
119   -0.27386 + 0.00000i
120   -0.27386 + 0.00000i
121
122 ****      空      間      狀      態      響      應      ****
123
124     ***位移反應量***
125     時間(秒)      第0點位移      第1點位移
126     0.00000      0.00000      0.00000
127     0.25000      0.21492      -0.22987
128     0.50000      0.25004      -0.35470

```

129	0.75000	0.05573	-0.33640
130	1.00000	-0.24948	-0.22449
131	1.25000	-0.46009	-0.11667
132	1.50000	-0.42719	-0.08772
133	1.75000	-0.16339	-0.13694
134	2.00000	0.16470	-0.19127
135	2.25000	0.35150	-0.16148
136	2.50000	0.29406	-0.01133
137	2.75000	0.06104	0.20983
138	3.00000	-0.15916	0.39484
139	3.25000	-0.19405	0.44820
140	3.50000	-0.01072	0.34900
141	3.75000	0.25996	0.16362
142	4.00000	0.41574	-0.00063
143	4.25000	0.32686	-0.06818
144	4.50000	0.02989	-0.04347
145	4.75000	-0.29475	-0.00140
146	5.00000	-0.44636	-0.02744
147	5.25000	-0.34180	-0.15056
148	5.50000	-0.07117	-0.31695
149	5.75000	0.16771	-0.42386
150	6.00000	0.20952	-0.39017
151	6.25000	0.03749	-0.21425
152	6.50000	-0.20635	0.02175
153	6.75000	-0.32377	0.20462
154	7.00000	-0.20324	0.26322
155	7.25000	0.09796	0.21151
156	7.50000	0.39066	0.13182
157	7.75000	0.48419	0.11123
158	8.00000	0.31878	0.17642
159	8.25000	0.00684	0.27333
160	8.50000	-0.24565	0.30628
161	8.75000	-0.28252	0.20873
162	9.00000	-0.10476	-0.00449
163	9.25000	0.13358	-0.24096
164	9.50000	0.23739	-0.38862
165	9.75000	0.11133	-0.38795
166	10.00000	-0.17031	-0.26839
167	10.25000	-0.41411	-0.12402
168	10.50000	-0.44314	-0.04607
169	10.75000	-0.22224	-0.05999
170	11.00000	0.11545	-0.11112
171	11.25000	0.35943	-0.10880
172	11.50000	0.36673	0.00308
173	11.75000	0.15905	0.19940

174	12.00000	-0.09587	0.38483
175	12.25000	-0.20504	0.45571
176	12.50000	-0.08778	0.36968
177	12.75000	0.16696	0.17462
178	13.00000	0.36405	-0.02355
179	13.25000	0.34155	-0.13153
180	13.50000	0.08761	-0.12865
181	13.75000	-0.24773	-0.07456
182	14.00000	-0.45468	-0.06013
183	14.25000	-0.40817	-0.13687
184	14.50000	-0.15337	-0.27557
185	14.75000	0.12764	-0.38380
186	15.00000	0.24444	-0.37035
187	15.25000	0.13147	-0.21132
188	15.50000	-0.10790	0.02893
189	15.75000	-0.27710	0.23718
190	16.00000	-0.22823	0.32420
191	16.25000	0.03016	0.28046
192	16.50000	0.33595	0.17648
193	16.75000	0.48512	0.10818
194	17.00000	0.37409	0.12661
195	17.25000	0.07243	0.20154
196	17.50000	-0.22502	0.24496
197	17.75000	-0.33324	0.17738
198	18.00000	-0.20426	-0.01013
199	18.25000	0.04250	-0.24264
200	18.50000	0.20792	-0.40710
201	18.75000	0.15650	-0.42564
202	19.00000	-0.08581	-0.30576
203	19.25000	-0.34866	-0.13248
204	19.50000	-0.43720	-0.00840
205	19.75000	-0.27055	0.01617
206	20.00000	0.05899	-0.02598
207			
208	***速度反應量***		
209	時間(秒)	第0點速度	第1點速度
210	0.00000	1.00000	-1.00000
211	0.25000	0.58980	-0.76397
212	0.50000	-0.34472	-0.20776
213	0.75000	-1.12473	0.31822
214	1.00000	-1.16932	0.50669
215	1.25000	-0.40848	0.30209
216	1.50000	0.66276	-0.06981
217	1.75000	1.32798	-0.27106
218	2.00000	1.14918	-0.09891

219	2.25000	0.27150	0.36384
220	2.50000	-0.68137	0.80239
221	2.75000	-1.04714	0.89027
222	3.00000	-0.59027	0.52147
223	3.25000	0.33488	-0.10947
224	3.50000	1.03764	-0.63639
225	3.75000	0.98231	-0.76972
226	4.00000	0.17047	-0.49033
227	4.25000	-0.85551	-0.05376
228	4.50000	-1.39079	0.19702
229	4.75000	-1.06230	0.07757
230	5.00000	-0.09099	-0.30718
231	5.25000	0.86250	-0.63940
232	5.50000	1.16021	-0.61797
233	5.75000	0.63201	-0.17891
234	6.00000	-0.30947	0.44983
235	6.25000	-0.96446	0.89883
236	6.50000	-0.84346	0.90829
237	6.75000	-0.01543	0.50405
238	7.00000	0.93873	-0.02466
239	7.25000	1.33504	-0.32944
240	7.50000	0.86961	-0.24519
241	7.75000	-0.16423	0.09982
242	8.00000	-1.07829	0.38275
243	8.25000	-1.26926	0.32347
244	8.50000	-0.63856	-0.10814
245	8.75000	0.34260	-0.66211
246	9.00000	0.96849	-0.97773
247	9.25000	0.79769	-0.83397
248	9.50000	-0.03596	-0.30495
249	9.75000	-0.91927	0.28885
250	10.00000	-1.19483	0.59990
251	10.25000	-0.62831	0.48960
252	10.50000	0.42146	0.11597
253	10.75000	1.25027	-0.18759
254	11.00000	1.30015	-0.15581
255	11.25000	0.54914	0.21527
256	11.50000	-0.47486	0.66225
257	11.75000	-1.06577	0.84014
258	12.00000	-0.83473	0.56903
259	12.25000	0.01942	-0.03238
260	12.50000	0.85463	-0.62152
261	12.75000	1.04284	-0.86314
262	13.00000	0.41724	-0.65558
263	13.25000	-0.60601	-0.19390

264	13.50000	-1.31786	0.17354
265	13.75000	-1.21428	0.19331
266	14.00000	-0.35161	-0.11527
267	14.25000	0.69109	-0.47786
268	14.50000	1.21635	-0.56536
269	14.75000	0.89490	-0.23480
270	15.00000	-0.00743	0.35989
271	15.25000	-0.82181	0.86655
272	15.50000	-0.95159	0.97454
273	15.75000	-0.29536	0.62783
274	16.00000	0.68039	0.06196
275	16.25000	1.27035	-0.36076
276	16.50000	1.02935	-0.40194
277	16.75000	0.08958	-0.10769
278	17.00000	-0.92789	0.23319
279	17.25000	-1.34545	0.30267
280	17.50000	-0.90137	-0.01290
281	17.75000	0.06986	-0.53470
282	18.00000	0.87584	-0.91205
283	18.25000	0.95487	-0.86727
284	18.50000	0.27087	-0.39275
285	18.75000	-0.66365	0.23885
286	19.00000	-1.15237	0.65906
287	19.25000	-0.81025	0.65360
288	19.50000	0.16022	0.30322
289	19.75000	1.10687	-0.08266
290	20.00000	1.38330	-0.19167
291			
292	*** 加速度反應量	***	
293	時間(秒)	第0點加速度	第1點加速度
294	0.00000	-0.00001	0.00000
295	0.25000	-3.06865	1.77915
296	0.50000	-3.91924	2.41899
297	0.75000	-1.90291	1.56854
298	1.00000	1.59692	-0.10000
299	1.25000	4.13427	-1.37370
300	1.50000	3.92096	-1.35785
301	1.75000	1.08615	-0.10580
302	2.00000	-2.41207	1.42387
303	2.25000	-4.16093	2.05191
304	2.50000	-2.98595	1.22157
305	2.75000	0.22894	-0.59516
306	3.00000	3.17096	-2.21599
307	3.25000	3.73331	-2.56899
308	3.50000	1.50325	-1.43891

309	3.75000	-1.94513	0.38535
310	4.00000	-4.15996	1.66549
311	4.25000	-3.54126	1.58013
312	4.50000	-0.47276	0.29344
313	4.75000	2.94195	-1.17342
314	5.00000	4.35380	-1.67566
315	5.25000	2.81575	-0.76496
316	5.50000	-0.55606	0.98310
317	5.75000	-3.37252	2.36626
318	6.00000	-3.65585	2.39875
319	6.25000	-1.23187	1.00696
320	6.50000	2.15049	-0.91239
321	6.75000	4.05613	-2.11353
322	7.00000	3.08526	-1.86584
323	7.25000	-0.13356	-0.45420
324	7.50000	-3.37930	1.03536
325	7.75000	-4.39701	1.49184
326	8.00000	-2.48209	0.56943
327	8.25000	1.02494	-1.06597
328	8.50000	3.68159	-2.20770
329	8.75000	3.66015	-1.96501
330	9.00000	1.02961	-0.40107
331	9.25000	-2.29966	1.49816
332	9.50000	-3.92842	2.50406
333	9.75000	-2.66510	1.99713
334	10.00000	0.62954	0.39233
335	10.25000	3.64501	-1.16036
336	10.50000	4.24715	-1.58829
337	10.75000	1.98240	-0.64900
338	11.00000	-1.59904	0.90631
339	11.25000	-4.02951	1.87293
340	11.50000	-3.65500	1.45460
341	11.75000	-0.79295	-0.16137
342	12.00000	2.49801	-1.92279
343	12.25000	3.87320	-2.64298
344	12.50000	2.35652	-1.82985
345	12.75000	-0.97113	-0.03063
346	13.00000	-3.73471	1.55041
347	13.25000	-3.94160	1.89232
348	13.50000	-1.39072	0.86505
349	13.75000	2.17902	-0.69265
350	14.00000	4.30628	-1.57820
351	14.25000	3.53423	-1.08522
352	14.50000	0.43145	0.48878
353	14.75000	-2.81159	2.04576

354	15.00000	-3.92586	2.45919
355	15.25000	-2.15997	1.37115
356	15.50000	1.19476	-0.54733
357	15.75000	3.71966	-2.05709
358	16.00000	3.57907	-2.20970
359	16.25000	0.82022	-1.00121
360	16.50000	-2.65356	0.63787
361	16.75000	-4.41847	1.50775
362	17.00000	-3.23445	0.98993
363	17.25000	0.08186	-0.51644
364	17.50000	3.23009	-1.87995
365	17.75000	4.04190	-2.04248
366	18.00000	2.00209	-0.77653
367	18.25000	-1.39562	1.14059
368	18.50000	-3.70759	2.46007
369	18.75000	-3.26758	2.32857
370	19.00000	-0.36492	0.87979
371	19.25000	2.95668	-0.86472
372	19.50000	4.33845	-1.71523
373	19.75000	2.77016	-1.14687
374	20.00000	-0.69378	0.33986

375

376

377 時間序列：

378

379	0.00,	0.25,	0.50,	0.75,	1.00,
380	1.25,	1.50,	1.75,	2.00,	2.25,
381	2.50,	2.75,	3.00,	3.25,	3.50,
382	3.75,	4.00,	4.25,	4.50,	4.75,
383	5.00,	5.25,	5.50,	5.75,	6.00,
384	6.25,	6.50,	6.75,	7.00,	7.25,
385	7.50,	7.75,	8.00,	8.25,	8.50,
386	8.75,	9.00,	9.25,	9.50,	9.75,
387	10.00,	10.25,	10.50,	10.75,	11.00,
388	11.25,	11.50,	11.75,	12.00,	12.25,
389	12.50,	12.75,	13.00,	13.25,	13.50,
390	13.75,	14.00,	14.25,	14.50,	14.75,
391	15.00,	15.25,	15.50,	15.75,	16.00,
392	16.25,	16.50,	16.75,	17.00,	17.25,
393	17.50,	17.75,	18.00,	18.25,	18.50,
394	18.75,	19.00,	19.25,	19.50,	19.75,
395	20.00,				

396

397 位移序列：

398

399 第 0 點

400	0.0000,	0.2149,	0.2500,	0.0557,	-0.2495,
401	-0.4601,	-0.4272,	-0.1634,	0.1647,	0.3515,
402	0.2941,	0.0610,	-0.1592,	-0.1941,	-0.0107,
403	0.2600,	0.4157,	0.3269,	0.0299,	-0.2948,
404	-0.4464,	-0.3418,	-0.0712,	0.1677,	0.2095,
405	0.0375,	-0.2063,	-0.3238,	-0.2032,	0.0980,
406	0.3907,	0.4842,	0.3188,	0.0068,	-0.2456,
407	-0.2825,	-0.1048,	0.1336,	0.2374,	0.1113,
408	-0.1703,	-0.4141,	-0.4431,	-0.2222,	0.1155,
409	0.3594,	0.3667,	0.1591,	-0.0959,	-0.2050,
410	-0.0878,	0.1670,	0.3640,	0.3415,	0.0876,
411	-0.2477,	-0.4547,	-0.4082,	-0.1534,	0.1276,
412	0.2444,	0.1315,	-0.1079,	-0.2771,	-0.2282,
413	0.0302,	0.3359,	0.4851,	0.3741,	0.0724,
414	-0.2250,	-0.3332,	-0.2043,	0.0425,	0.2079,
415	0.1565,	-0.0858,	-0.3487,	-0.4372,	-0.2706,
416	0.0590,				

417 第 1 點

418	0.0000,	-0.2299,	-0.3547,	-0.3364,	-0.2245,
419	-0.1167,	-0.0877,	-0.1369,	-0.1913,	-0.1615,
420	-0.0113,	0.2098,	0.3948,	0.4482,	0.3490,
421	0.1636,	-0.0006,	-0.0682,	-0.0435,	-0.0014,
422	-0.0274,	-0.1506,	-0.3170,	-0.4239,	-0.3902,
423	-0.2143,	0.0217,	0.2046,	0.2632,	0.2115,
424	0.1318,	0.1112,	0.1764,	0.2733,	0.3063,
425	0.2087,	-0.0045,	-0.2410,	-0.3886,	-0.3880,
426	-0.2684,	-0.1240,	-0.0461,	-0.0600,	-0.1111,
427	-0.1088,	0.0031,	0.1994,	0.3848,	0.4557,
428	0.3697,	0.1746,	-0.0236,	-0.1315,	-0.1286,
429	-0.0746,	-0.0601,	-0.1369,	-0.2756,	-0.3838,
430	-0.3704,	-0.2113,	0.0289,	0.2372,	0.3242,
431	0.2805,	0.1765,	0.1082,	0.1266,	0.2015,
432	0.2450,	0.1774,	-0.0101,	-0.2426,	-0.4071,
433	-0.4256,	-0.3058,	-0.1325,	-0.0084,	0.0162,
434	-0.0260,				

435

436 速度序列 :

437

438 第 0 點

439	1.0000,	0.5898,	-0.3447,	-1.1247,	-1.1693,
440	-0.4085,	0.6628,	1.3280,	1.1492,	0.2715,
441	-0.6814,	-1.0471,	-0.5903,	0.3349,	1.0376,
442	0.9823,	0.1705,	-0.8555,	-1.3908,	-1.0623,
443	-0.0910,	0.8625,	1.1602,	0.6320,	-0.3095,

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444    -0.9645,    -0.8435,    -0.0154,    0.9387,    1.3350,
445    0.8696,    -0.1642,    -1.0783,    -1.2693,    -0.6386,
446    0.3426,    0.9685,    0.7977,    -0.0360,    -0.9193,
447    -1.1948,    -0.6283,    0.4215,    1.2503,    1.3002,
448    0.5491,    -0.4749,    -1.0658,    -0.8347,    0.0194,
449    0.8546,    1.0428,    0.4172,    -0.6060,    -1.3179,
450    -1.2143,    -0.3516,    0.6911,    1.2163,    0.8949,
451    -0.0074,    -0.8218,    -0.9516,    -0.2954,    0.6804,
452    1.2704,    1.0294,    0.0896,    -0.9279,    -1.3455,
453    -0.9014,    0.0699,    0.8758,    0.9549,    0.2709,
454    -0.6637,    -1.1524,    -0.8102,    0.1602,    1.1069,
455    1.3833,
456    第 1 點
457    -1.0000,    -0.7640,    -0.2078,    0.3182,    0.5067,
458    0.3021,    -0.0698,    -0.2711,    -0.0989,    0.3638,
459    0.8024,    0.8903,    0.5215,    -0.1095,    -0.6364,
460    -0.7697,    -0.4903,    -0.0538,    0.1970,    0.0776,
461    -0.3072,    -0.6394,    -0.6180,    -0.1789,    0.4498,
462    0.8988,    0.9083,    0.5040,    -0.0247,    -0.3294,
463    -0.2452,    0.0998,    0.3827,    0.3235,    -0.1081,
464    -0.6621,    -0.9777,    -0.8340,    -0.3049,    0.2889,
465    0.5999,    0.4896,    0.1160,    -0.1876,    -0.1558,
466    0.2153,    0.6623,    0.8401,    0.5690,    -0.0324,
467    -0.6215,    -0.8631,    -0.6556,    -0.1939,    0.1735,
468    0.1933,    -0.1153,    -0.4779,    -0.5654,    -0.2348,
469    0.3599,    0.8665,    0.9745,    0.6278,    0.0620,
470    -0.3608,    -0.4019,    -0.1077,    0.2332,    0.3027,
471    -0.0129,    -0.5347,    -0.9120,    -0.8673,    -0.3928,
472    0.2389,    0.6591,    0.6536,    0.3032,    -0.0827,
473    -0.1917,
474
475    加速度序列 :
476
477    第 0 點
478    0.0000,    -3.0687,    -3.9192,    -1.9029,    1.5969,
479    4.1343,    3.9210,    1.0861,    -2.4121,    -4.1609,
480    -2.9860,    0.2289,    3.1710,    3.7333,    1.5032,
481    -1.9451,    -4.1600,    -3.5413,    -0.4728,    2.9419,
482    4.3538,    2.8158,    -0.5561,    -3.3725,    -3.6558,
483    -1.2319,    2.1505,    4.0561,    3.0853,    -0.1336,
484    -3.3793,    -4.3970,    -2.4821,    1.0249,    3.6816,
485    3.6602,    1.0296,    -2.2997,    -3.9284,    -2.6651,
486    0.6295,    3.6450,    4.2471,    1.9824,    -1.5990,
487    -4.0295,    -3.6550,    -0.7929,    2.4980,    3.8732,
488    2.3565,    -0.9711,    -3.7347,    -3.9416,    -1.3907,
```

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489      2.1790,    4.3063,    3.5342,    0.4314,    -2.8116,
490     -3.9259,    -2.1600,    1.1948,    3.7197,    3.5791,
491      0.8202,    -2.6536,    -4.4185,    -3.2344,    0.0819,
492      3.2301,    4.0419,    2.0021,    -1.3956,    -3.7076,
493     -3.2676,    -0.3649,    2.9567,    4.3385,    2.7702,
494     -0.6938,
495 第 1 點
496      0.0000,    1.7791,    2.4190,    1.5685,    -0.1000,
497     -1.3737,    -1.3579,    -0.1058,    1.4239,    2.0519,
498      1.2216,    -0.5952,    -2.2160,    -2.5690,    -1.4389,
499      0.3854,    1.6655,    1.5801,    0.2934,    -1.1734,
500     -1.6757,    -0.7650,    0.9831,    2.3663,    2.3987,
501      1.0070,    -0.9124,    -2.1135,    -1.8658,    -0.4542,
502      1.0354,    1.4918,    0.5694,    -1.0660,    -2.2077,
503     -1.9650,    -0.4011,    1.4982,    2.5041,    1.9971,
504      0.3923,    -1.1604,    -1.5883,    -0.6490,    0.9063,
505      1.8729,    1.4546,    -0.1614,    -1.9228,    -2.6430,
506     -1.8299,    -0.0306,    1.5504,    1.8923,    0.8650,
507     -0.6926,    -1.5782,    -1.0852,    0.4888,    2.0458,
508      2.4592,    1.3712,    -0.5473,    -2.0571,    -2.2097,
509     -1.0012,    0.6379,    1.5077,    0.9899,    -0.5164,
510     -1.8799,    -2.0425,    -0.7765,    1.1406,    2.4601,
511      2.3286,    0.8798,    -0.8647,    -1.7152,    -1.1469,
512      0.3399,
513
514 時間序列 :
515      0.00,    0.25,    0.50,    0.75,    1.00,
516      1.25,    1.50,    1.75,    2.00,    2.25,
517      2.50,    2.75,    3.00,    3.25,    3.50,
518      3.75,    4.00,    4.25,    4.50,    4.75,
519      5.00,    5.25,    5.50,    5.75,    6.00,
520      6.25,    6.50,    6.75,    7.00,    7.25,
521      7.50,    7.75,    8.00,    8.25,    8.50,
522      8.75,    9.00,    9.25,    9.50,    9.75,
523     10.00,    10.25,    10.50,    10.75,    11.00,
524     11.25,    11.50,    11.75,    12.00,    12.25,
525     12.50,    12.75,    13.00,    13.25,    13.50,
526     13.75,    14.00,    14.25,    14.50,    14.75,
527     15.00,    15.25,    15.50,    15.75,    16.00,
528     16.25,    16.50,    16.75,    17.00,    17.25,
529     17.50,    17.75,    18.00,    18.25,    18.50,
530     18.75,    19.00,    19.25,    19.50,    19.75,
531     20.00,
532
533 第0點變位序列 :
```

534	0.0000,	0.2500,	0.5000,	0.7500,	↻
	1.0000,				
535	1.2500,	1.5000,	1.7500,	2.0000,	↻
	2.2500,				
536	2.5000,	2.7500,	3.0000,	3.2500,	↻
	3.5000,				
537	3.7500,	4.0000,	4.2500,	4.5000,	↻
	4.7500,				
538	5.0000,	5.2500,	5.5000,	5.7500,	↻
	6.0000,				
539	6.2500,	6.5000,	6.7500,	7.0000,	↻
	7.2500,				
540	7.5000,	7.7500,	8.0000,	8.2500,	↻
	8.5000,				
541	8.7500,	9.0000,	9.2500,	9.5000,	↻
	9.7500,				
542	10.0000,	10.2500,	10.5000,	10.7500,	↻
	11.0000,				
543	11.2500,	11.5000,	11.7500,	12.0000,	↻
	12.2500,				
544	12.5000,	12.7500,	13.0000,	13.2500,	↻
	13.5000,				
545	13.7500,	14.0000,	14.2500,	14.5000,	↻
	14.7500,				
546	15.0000,	15.2500,	15.5000,	15.7500,	↻
	16.0000,				
547	16.2500,	16.5000,	16.7500,	17.0000,	↻
	17.2500,				
548	17.5000,	17.7500,	18.0000,	18.2500,	↻
	18.5000,				
549	18.7500,	19.0000,	19.2500,	19.5000,	↻
	19.7500,				
550	20.0000,				
551					
552					
553	第1點變位序列：				
554	0.0000,	0.2500,	0.5000,	0.7500,	↻
	1.0000,				
555	1.2500,	1.5000,	1.7500,	2.0000,	↻
	2.2500,				
556	2.5000,	2.7500,	3.0000,	3.2500,	↻
	3.5000,				
557	3.7500,	4.0000,	4.2500,	4.5000,	↻
	4.7500,				
558	5.0000,	5.2500,	5.5000,	5.7500,	↻

	6.0000,				
559	6.2500,	6.5000,	6.7500,	7.0000,	↻
	7.2500,				
560	7.5000,	7.7500,	8.0000,	8.2500,	↻
	8.5000,				
561	8.7500,	9.0000,	9.2500,	9.5000,	↻
	9.7500,				
562	10.0000,	10.2500,	10.5000,	10.7500,	↻
	11.0000,				
563	11.2500,	11.5000,	11.7500,	12.0000,	↻
	12.2500,				
564	12.5000,	12.7500,	13.0000,	13.2500,	↻
	13.5000,				
565	13.7500,	14.0000,	14.2500,	14.5000,	↻
	14.7500,				
566	15.0000,	15.2500,	15.5000,	15.7500,	↻
	16.0000,				
567	16.2500,	16.5000,	16.7500,	17.0000,	↻
	17.2500,				
568	17.5000,	17.7500,	18.0000,	18.2500,	↻
	18.5000,				
569	18.7500,	19.0000,	19.2500,	19.5000,	↻
	19.7500,				
570	20.0000,				
571					
572					
573	第0點速度序列：				
574	0.0000,	0.2500,	0.5000,	0.7500,	↻
	1.0000,				
575	1.2500,	1.5000,	1.7500,	2.0000,	↻
	2.2500,				
576	2.5000,	2.7500,	3.0000,	3.2500,	↻
	3.5000,				
577	3.7500,	4.0000,	4.2500,	4.5000,	↻
	4.7500,				
578	5.0000,	5.2500,	5.5000,	5.7500,	↻
	6.0000,				
579	6.2500,	6.5000,	6.7500,	7.0000,	↻
	7.2500,				
580	7.5000,	7.7500,	8.0000,	8.2500,	↻
	8.5000,				
581	8.7500,	9.0000,	9.2500,	9.5000,	↻
	9.7500,				
582	10.0000,	10.2500,	10.5000,	10.7500,	↻
	11.0000,				

583	11. 2500,	11. 5000,	11. 7500,	12. 0000,	↻
	12. 2500,				
584	12. 5000,	12. 7500,	13. 0000,	13. 2500,	↻
	13. 5000,				
585	13. 7500,	14. 0000,	14. 2500,	14. 5000,	↻
	14. 7500,				
586	15. 0000,	15. 2500,	15. 5000,	15. 7500,	↻
	16. 0000,				
587	16. 2500,	16. 5000,	16. 7500,	17. 0000,	↻
	17. 2500,				
588	17. 5000,	17. 7500,	18. 0000,	18. 2500,	↻
	18. 5000,				
589	18. 7500,	19. 0000,	19. 2500,	19. 5000,	↻
	19. 7500,				
590	20. 0000,				
591					
592					
593	第1點速度序列：				
594	0. 0000,	0. 2500,	0. 5000,	0. 7500,	↻
	1. 0000,				
595	1. 2500,	1. 5000,	1. 7500,	2. 0000,	↻
	2. 2500,				
596	2. 5000,	2. 7500,	3. 0000,	3. 2500,	↻
	3. 5000,				
597	3. 7500,	4. 0000,	4. 2500,	4. 5000,	↻
	4. 7500,				
598	5. 0000,	5. 2500,	5. 5000,	5. 7500,	↻
	6. 0000,				
599	6. 2500,	6. 5000,	6. 7500,	7. 0000,	↻
	7. 2500,				
600	7. 5000,	7. 7500,	8. 0000,	8. 2500,	↻
	8. 5000,				
601	8. 7500,	9. 0000,	9. 2500,	9. 5000,	↻
	9. 7500,				
602	10. 0000,	10. 2500,	10. 5000,	10. 7500,	↻
	11. 0000,				
603	11. 2500,	11. 5000,	11. 7500,	12. 0000,	↻
	12. 2500,				
604	12. 5000,	12. 7500,	13. 0000,	13. 2500,	↻
	13. 5000,				
605	13. 7500,	14. 0000,	14. 2500,	14. 5000,	↻
	14. 7500,				
606	15. 0000,	15. 2500,	15. 5000,	15. 7500,	↻
	16. 0000,				
607	16. 2500,	16. 5000,	16. 7500,	17. 0000,	↻

```
        17.2500,  
608      17.5000,      17.7500,      18.0000,      18.2500,      ↗  
        18.5000,  
609      18.7500,      19.0000,      19.2500,      19.5000,      ↗  
        19.7500,  
610      20.0000,  
611  
612 請按任意鍵繼續 . . .  
613 */  
614
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