```csharp
1
2  // 參考 https://www.nature.com/articles/s41598-020-72193-2
3  // 其中的實例，  y(t) = 2t + cos(10t^2 + 100t) + cos(60t) +
4  // cos(40t) + cos(t^2 + 20t) + cos(0.5t^2 + 5t) + 1
5  // t可以無限大，但t有循環，  其週期是2 * PI。
6
7
8  using System;
9  using Matrix_0;
10
11 namespace ConsoleApp51
12 {
13     internal class Program
14     {
15         static void Main(string[] args)
16         {
17
18     double step = 0.97;
19     ReMatrix y;
20     int iNum = (int)(17.75 / step);
21     ReMatrix Mat = new ReMatrix(iNum, 2);
22
23     for (int i = 0; i != iNum; i++)
24     {
25         double tTemp = step * i;
26         // 第二個參數為0，表示時間的循環週期是 2 * PI 。
27         Remainder Rem = new Remainder(tTemp, 0);
28         double t = Rem.Value;
29         double[,] t2 = { { t } };
30         ReMatrix tMat = (ReMatrix)t2;
31
32         double[,] y0 = { { 2 * t } };
33         double[,] y1 = { { Math.Cos(10 * t * t + 100 * t) } };
34         double[,] y2 = { { Math.Cos(60 * t) } };
35         double[,] y3 = { { Math.Cos(40 * t) } };
36         double[,] y4 = { { Math.Cos(t * t + 20 * t) } };
37         double[,] y5 = { { Math.Cos(0.5 * t * t + 5 * t) } };
38         double[,] y6 = { { 1 } };
39         y = (ReMatrix)y0 + y1 + y2 + y3 + y4 + y5 + y6;
40
41         Mat[i, 0] = tMat;
42         Mat[i, 1] = y;
43     }
44     Console.WriteLine("**  時頻分析【輸出數值結果】(方法一)  **\n");
45     Console.WriteLine("         t <= 2 * PI            y(振幅)    \n");
46     Console.WriteLine("\n{0}\n", new PR(Mat));
47
```

```csharp
48      Console.WriteLine("\n=====================================\n   ↵
          \n");
49
50      for(int i = 0; i != iNum; i++)
51      {
52          double tTemp = step * i;
53
54          // 第二個參數為0，表示時間最大為 2 * PI 循環。
55          Remainder Rem = new Remainder(tTemp, 0);
56          double t = Rem.Value;
57          double[,] t2 = { { t } };
58          ReMatrix tMat = (ReMatrix)t2;
59
60          double[,] y0 = { { 2 * t } };
61          double[,] y1 = { { Math.Cos(10 * t * t + 100 * t) } };
62          double[,] y2 = { { Math.Cos(60 * t) } };
63          double[,] y3 = { { Math.Cos(40 * t) } };
64          double[,] y4 = { { Math.Cos(t * t + 20 * t) } };
65          double[,] y5 = { { Math.Cos(0.5 * t * t + 5 * t) } };
66          double[,] y6 = { { 1 } };
67
68          // D 為特徵值(7X7)矩陣。
69          ReMatrix D = new ReMatrix(7, 7);
70          D[0, 0] = (ReMatrix)y0;
71          D[1, 1] = (ReMatrix)y1;
72          D[2, 2] = (ReMatrix)y2;
73          D[3, 3] = (ReMatrix)y3;
74          D[4, 4] = (ReMatrix)y4;
75          D[5, 5] = (ReMatrix)y5;
76          D[6, 6] = (ReMatrix)y6;
77          // Q 為特徵向量(7X7)矩陣。
78          Iden I = new Iden(7, 7);
79          ReMatrix Q = I.Matrix;
80          // d 為係數向量。
81          double[,] d = { {1}, {1}, {1}, {1}, {1}, {1}, {1} };
82          y = Q * D * d;
83          y = y[0, 0] + y[1, 0] + y[2, 0] + y[3, 0] + y[4, 0] + y[5, 0]↵
              + y[6, 0];
84
85          Mat[i, 0] = tMat;
86          Mat[i, 1] = y;
87      }
88      Console.WriteLine("**  時頻分析【輸出數值結果】(方法二)  **\n");
89      Console.WriteLine("      t <= 2 * PI        y(振幅)   \n");
90      Console.WriteLine("\n{0}\n", new PR(Mat));
91
92      }
```

```
93        }
94  }
95
96  // ***  數值的輸出結果，請參見儲存庫的C#程式碼。  ***
```