

```

100: # FAST FOURIER TRANSFORM;
110: # FFT_02_V_1_1.TXT;
120: # CI-2, V.1.1.0, PERSEUS-8;
130: # AUG.31,2021;
140: # MITSURU YAMADA;
150: #####;
180: # ---- DATA ----
190: P=6.28319;
200: M=32;
210: K=4;
220: J=0;
225: N=0;
230: N)Y=N P K** M/)S N P J** M/)C+;
231: N)Z=0;
232: N;;
234: N)Y
240: N=N 1+;
250: N M?< 230!
990: # ----- BIT REVERSE -----
1010: P=3.14159;
1020: L=M 1-;
1030: D=M 2/;
1040: S=M)L 2)L/ 1E-4+)I;
1050: J=D;
1060: I=1;
1070: I J?>= 1140!
1080: R=J)Y;
1090: T=J)Z;
1100: J)Y=I)Y;
1110: J)Z=I)Z;
1120: I)Y=R;
1130: I)Z=T;
1140: K=D;
1150: K J?> 1190!
1160: J=J K-;
1170: K=K 2/;
1180: 1150!
1190: J=J K+;
1195: I=I 1+;
1200: I M?<= 1070!
1300: # ----- FFT -----
1310: A=1;
1315: # --- EXPONENTIATION ---;
1320: C=2;
1330: B=1;
1340: K=1;
1350: B=B C*;
1360: K=K 1+;
1370: K A?<= 1350!
1372: A;;
1374: B
1375: # -----;
1380: C=B 2/;
1390: R=1;
1400: U=0;
1410: F=P C/)C;
1420: G=P C/)S -1*;
1430: J=1;
1440: H=J 1-;
1450: I=H;
1460: Q=I C+;
1470: X=Q)Y R* Q)Z U*-;
1480: V=Q)Y U* Q)Z R*+;
1490: Q)Y=I)Y X-;
1500: Q)Z=I)Z V-;
1510: I)Y=I)Y X+;
1520: I)Z=I)Z V+;
1530: I=I B+;
1540: I L?<= 1460!
1550: X=R;
1560: R=X F* U G*-;
1570: U=X G* U F*+;
1580: J=J 1+;
1590: J C?<= 1440!
1600: A=A 1+;
1610: A S?<= 1320!

```

```
2000: # -- POWER SPECTRUM --
2010: K=0;
2020: K)Z= K)Y K)Y* K)Z K)Z*+)Q;
2030: K;;
2035: K)Z
2040: K=K 1+;
2050: K M?< 2020!
>
```

```
---- DATA ----
```

```
0 1.00001E0
1.00000E0 1.70711E0
2.00000E0 2.00002E0
3.00000E0 1.70712E0
4.00000E0 1.00004E0
5.00000E0 2.92920E-1
6.00000E0 1.00000E-5
7.00000E0 2.92880E-1
8.00000E0 9.99970E-1
9.00000E0 1.70710E0
1.00000E1 2.00002E0
1.10000E1 1.70714E0
1.20000E1 1.00004E0
1.30000E1 2.92890E-1
1.40000E1 0
1.50000E1 2.92910E-1
1.60000E1 1.00002E0
1.70000E1 1.70713E0
1.80000E1 2.00001E0
1.90000E1 1.70711E0
2.00000E1 9.99990E-1
2.10000E1 2.92830E-1
2.20000E1 0
2.30000E1 2.92980E-1
2.40000E1 1.00012E0
2.50000E1 1.70719E0
2.60000E1 2.00001E0
2.70000E1 1.70711E0
2.80000E1 9.99990E-1
2.90000E1 2.92750E-1
3.00000E1 0
3.10000E1 2.92980E-1
```

```
----- BIT REVERSE -----
```

```
----- FFT -----
```

```
1.00000E0 2.00000E0
2.00000E0 4.00000E0
3.00000E0 8.00000E0
4.00000E0 1.60000E1
5.00000E0 3.20000E1
```

```
-- POWER SPECTRUM --
```

```
0 3.20001E1
1.00000E0 8.29140E-5
2.00000E0 1.47752E-4
3.00000E0 5.00900E-4
4.00000E0 1.60006E1
5.00000E0 5.08940E-4
6.00000E0 1.17508E-4
7.00000E0 1.22726E-4
8.00000E0 3.28937E-4
9.00000E0 2.65148E-4
1.00000E1 2.01702E-4
1.10000E1 1.79634E-4
1.20000E1 4.92345E-4
1.30000E1 5.95590E-5
1.40000E1 4.55531E-5
1.50000E1 4.51407E-5
1.60000E1 3.90500E-4
1.70000E1 4.51484E-5
1.80000E1 4.55521E-5
1.90000E1 5.95415E-5
2.00000E1 2.37453E-4
2.10000E1 1.79614E-4
2.20000E1 2.01699E-4
2.30000E1 2.65153E-4
2.40000E1 3.28937E-4
2.50000E1 1.22731E-4
2.60000E1 1.17508E-4
```

2.70000E1 5.08945E-4
2.80000E1 1.60009E1
2.90000E1 5.00920E-4
3.00000E1 1.47757E-4
3.10000E1 8.29185E-5