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**How to use 'FFT\_Smoothing.for' : Fourier transform and spectrum analysis**

Diffusion1D.for

Input file: fft.idt

Wave data file: SampleWave.dat : this is denoted by 'fft.idt'

Output files:

fft.frd  
fft.thd

.....

コメント [A1]: Frequency  
range data: spectrum

コメント [A2]: Time range  
data: original data and inverse  
FT data

**fft.idt**

```
/const/
  graacc      budwat      refhed
  .1000000E+01 .1000000E+01 .1000000E+01

/dainf/
  ndat      rdpn
  1000      .6000000E+00

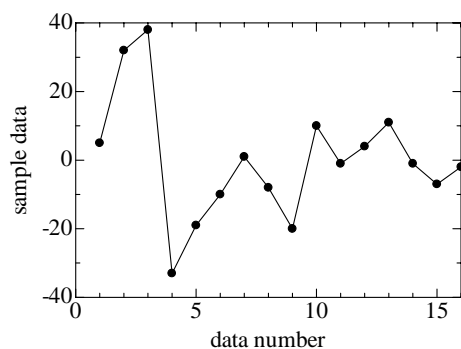
/tcinf/
  tint[sec.] nstart nend : (nstart and nend 0>: designated; -1:all)
  .5000000E+00 -1 -1

/flinf/
  ifinp ; -1: no, 1: Parzen Window, 2: Hanning, 3: Median filter, 4: 2&3
  -1
  band[Hz] lowcut[Hz] highcut[Hz] for Parzen Window
  0.300000E+00 .0000000E+00 .1000000E+10
  ncycs
  10
  num for Median filter
  5

/file_flag/
  data filename[in 30 letters including symbols from 16th column]
  SampleWave.dat
  flag name[in 5 letters including symbols from 16th column]
  /data
```

**コメント [A3]:** ファイル名は固定**コメント [A4]:** No valid**コメント [A5]:** No valid**コメント [A6]:** Time increment:  
sampling period**コメント [A7]:** -1: read wave  
data from the first line; number  
described: read wave data from  
the number line denoted.**コメント [A8]:** -1: read wave  
data until the end line; number  
described: read wave data until  
the number line denoted.**コメント [A9]:** Control filter and  
smoothing operation; -1: no, 1:  
Parzen Window, 2: Hanning,  
3: Median filter, 4: 2&3**コメント [A10]:** For Hanning  
window; number of operations**コメント [A11]:** ファイル名は固  
定**コメント [A12]:** This flag must  
be denoted in 'fft.idt'.**コメント [A13]:** If number of  
data is not power of 2, this  
program will add data "0.0  
whose number will be power of  
2.**SampleWave.dat**

```
/data/
5.0
32.0
38.0
-33.0
-19.0
-10.0
1.0
-8.0
-20.0
10.0
-1.0
4.0
11.0
-1.0
-7.0
-2.0
```



number of data: 16

'fft.frd' files:

No.,	Freq.,	Period.,	Amp.,	F.Amp.,	P.Amp.,	Phase
1,	0.000000E+00,	0.999000E+03,	0.000000E+00,	0.000000E+00,	0.000000E+00,	0.000000E+00
2,	0.125000E+00,	0.800000E+01,	0.879587E+01,	0.351835E+02,	0.309469E+03,	0.280979E+02
3,	0.250000E+00,	0.400000E+01,	0.100178E+02,	0.400712E+02,	0.401426E+03,	0.123224E+03
4,	0.375000E+00,	0.266667E+01,	0.129399E+02,	0.517597E+02,	0.669767E+03,	0.112528E+03
5,	0.500000E+00,	0.200000E+01,	0.110510E+02,	0.442040E+02,	0.488500E+03,	0.523523E+02
6,	0.625000E+00,	0.160000E+01,	0.569285E+01,	0.227714E+02,	0.129634E+03,	0.137363E+03
7,	0.750000E+00,	0.133333E+01,	0.761698E+01,	0.304679E+02,	0.232073E+03,	0.161873E+03
8,	0.875000E+00,	0.114285E+01,	0.634680E+01,	0.253872E+02,	0.161127E+03,	0.512704E+02
9,	0.100000E+01,	0.100000E+01,	0.200000E+01,	0.800000E+01,	0.800000E+01,	0.000000E+00

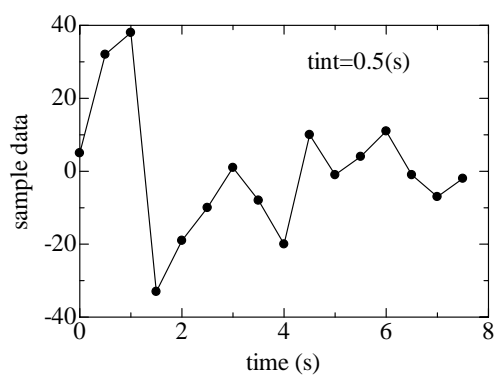
コメント [A14]: Number of line, frequency, period (1/0 -> 999), amplitude, Fourier amp., Power amp., phase

コメント [A15]: 16/2+1=9

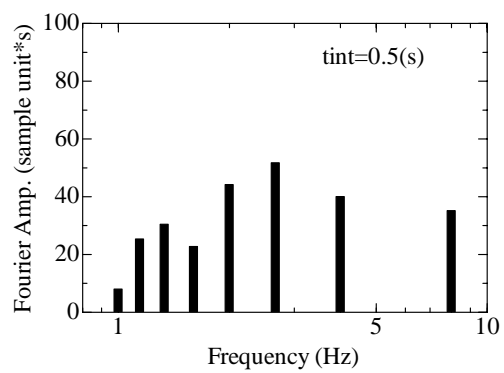
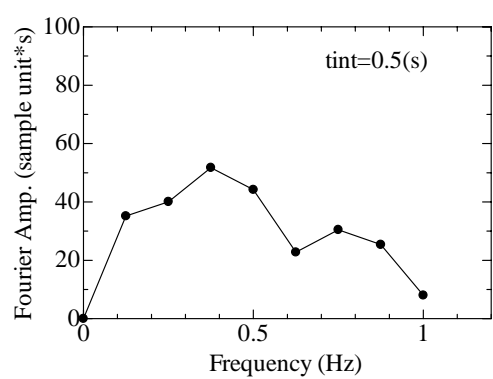
fft.thd

No.,	Time,	Original time histroy data,	inverse transformed data
0,	0.000000E+00,	0.500000E+01,	0.500000E+01
1,	0.500000E+00,	0.320000E+02,	0.320000E+02
2,	0.100000E+01,	0.380000E+02,	0.380000E+02
3,	0.150000E+01,	-0.330000E+02,	-0.330000E+02
4,	0.200000E+01,	-0.190000E+02,	-0.190000E+02
5,	0.250000E+01,	-0.100000E+02,	-0.100000E+02
6,	0.300000E+01,	0.100000E+01,	0.100000E+01
7,	0.350000E+01,	-0.800000E+01,	-0.800000E+01
8,	0.400000E+01,	-0.200000E+02,	-0.200000E+02
9,	0.450000E+01,	0.100000E+02,	0.999999E+01
10,	0.500000E+01,	-0.100000E+01,	-0.999999E+00
11,	0.550000E+01,	0.400000E+01,	0.400000E+01
12,	0.600000E+01,	0.110000E+02,	0.110000E+02
13,	0.650000E+01,	-0.100000E+01,	-0.999998E+00
14,	0.700000E+01,	-0.700000E+01,	-0.700000E+01
15,	0.750000E+01,	-0.200000E+01,	-0.200000E+01

コメント [A16]: Number of line, time(tinc\*No.), original sampled data, inverse transformed data



Time history of sample data



Spectrum