Subject: The spectra of fluctuations in variable
Posted by duxiyu@gmail.com on Wed, 14 Mar 2007 11:51:37 GMT
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I have a time series B(T).
The time resolution dt of the data is 4s and the amount N is 1000.
The unit of B and T is 'nT' and 's'.
I want to study its fluctuaions in frequence space using the power spectral density (PSD).

```
BB=FFT(B)
freq=FINDGEN(N)/(N*dt)
```

Then I am not clear how to caculate the PSD.
Maybe, PSD=(ABS(BB))^2, but there is a problem in the unit.
The unit of BB is 'nT' that is the same as B, so the unit of PSD which is obtained by the above method is 'nT^2'.
But in physical view the unit of PSD should be 'nT^2/Hz'.

The other question is how to caculate the phase difference between two B1 and B2.
I caculate it by the following method, but I am not sure whether it is right.

```
BB1=FFT(B1)
BB2=FFT(B2)
phase1=ATAN(BB1,/phase)
phase2=ATAN(BB2,/phase)
difference=phase1-phase2
```

Moreover, the angles seems not smoothed by regular method because of theirs periodicity.
Is there other method to smooth the angle data?

Best wishes,
Du Jian