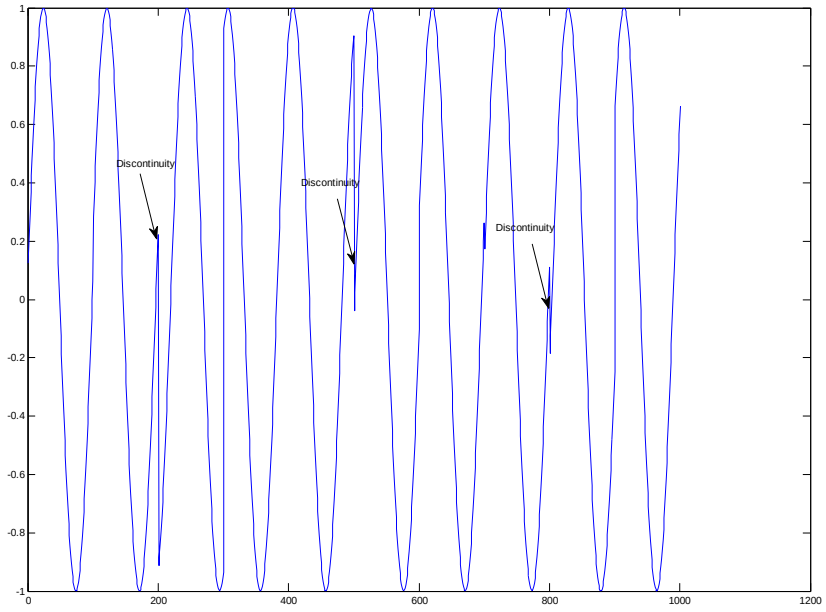
Modeling of Jitter

Hi!

I have read from some books that the phase noise causing jitter is modeled as 1/f (pink) Gaussian noise. Suppose you consider that ϕ is a random variable having Gaussian pink distribution. Then, the sine wave plagued with phase noise is given by $y(t) = Asin(\omega t + \phi)$. Implementing the above process in a digital computer, typically it would be done as follows: $y_n = y(nT_s) = Asin(\frac{2\pi f}{f_s}\ n + \phi)$, where n=0,1,2,…, and $f_s = \frac{1}{T_s}$. The question is how often should ϕ be sampled. Should ϕ by ϕ_n, meaning that ϕ is sampled at every step of n, or is it sampled once every cycle? But the problem is doing this way; the waveform becomes discontinuous at the edges of the cycles.

Our question is more clearly explained in the graph below:



The code used to generate the above plot is given below:

```
fs=100; % 100 samples per cycle
y=zeros(10*fs,1);
for n=1:10 % sampling phase noise once every cycle
      y((1:fs+1)+(n-1)*fs)=sin(2*pi*[0:1/fs:1]+randn); % randn is white
      Gaussian random variable
end
plot(y)
```