

```

=====Find_RMS_Input=====
let num = length(out)-1
let i = 0
let vpwr = 0
repeat $&num
let i = i + 1
let vpwr = vpwr + (mag(OUT[i])*mag(OUT[i]))/num
end
let vrms1 = sqrt(vpwr)
echo INPUT RMS = $&vrms1
=====

```

Performing a real RMS on the input can show this is true..

Circuit: PWL_Noise_1VRMS_@1KHz

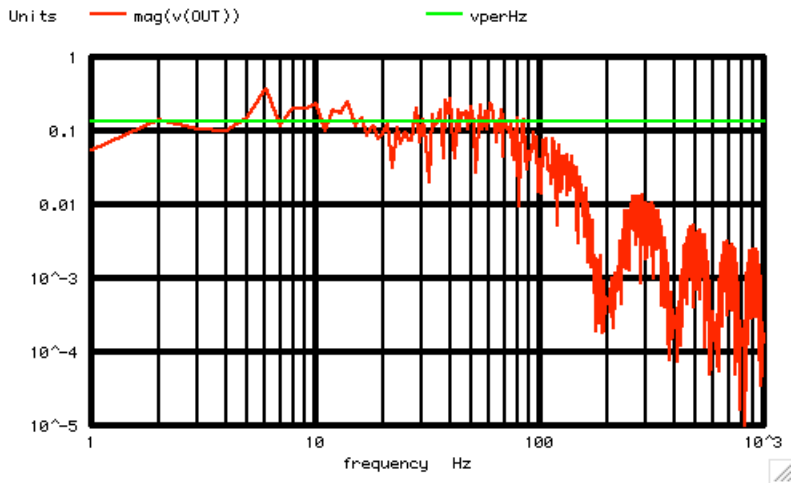
INPUT RMS = 1.00617

```

=====Find_Spectrum=====
linearize
set specwindow = "rectangular"
*SPEC FSTART FSTOP FSTEP VECTOR
spec 1 1000 1 v(OUT)
=====Find_Spectrum_RMS=====
let num = length(out)-1
let i = 0
let vpwr = 0
repeat $&num
let i = i + 1
let vpwr = vpwr + mag(OUT[i])* mag(OUT[i])
end
let vrms2 = sqrt(vpwr)
echo SPECTRUM RMS = $&vrms2
=====View_Spectrum=====
let BandW = 100
let vperHz = vrms2/sqrt(BandW)
set pensize = 2
plot mag(v(OUT)) vperHz loglog
.endc
.end
=====

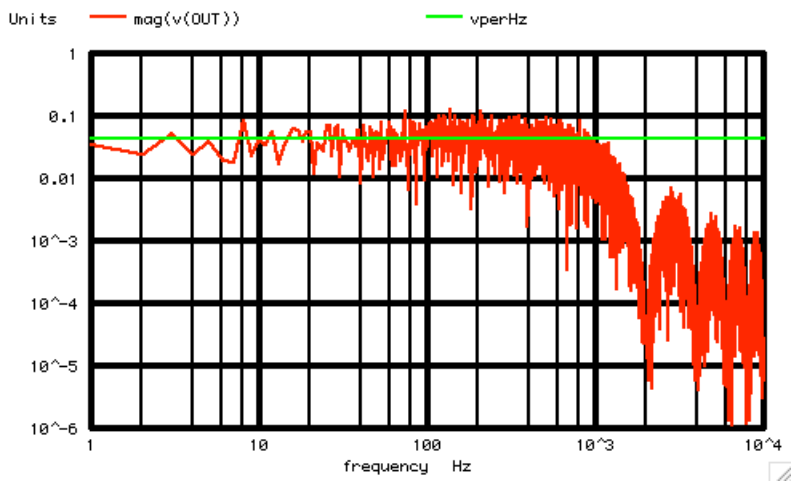
```

But now the same 1Vrms of noise is now packaged into 100Hz of Bandwidth.



SPECTRUM RMS = 1.35911

This is just the classical case of not using an anti-aliasing filter. The 100Hz spectrum is shown above. The 1kHz below. The 100Hz noise is like taking every one tenth sample from the 1KHz noise. By doing so, the 100Hz to 1KHz noise just gets aliased into the 100Hz noise spectrum.



SPECTRUM RMS = 1.36041

One does not need a lot of data points to find the standard deviation of something. Adding more data points does not really change a standard deviation. It just makes the rms or standard deviation value more precise.

Provided one's sampler is fast enough, under sampling noise provides the full noise under its full bandwidth at its full standard deviation or RMS value.

=====**Full_Netlist_For_Copy_Paste**=====

```
PWL_Noise_1VRMS_@100Hz
* www.idea2ic.com
* dsauersanjose@aol.com 2.11.10_10.49AM replace(OPT-SPACE)=>SPACE
* OUT Rload
* need to have a file called
* "rndsrc" in the "MacSpice"
* folder inside "Documents"
* /VpwlT\
```

