```
PWL Noise_RMS
    OUT
          Rload
                 To create a 1V_RMS 1kHz Noise with 1Hz resolution
                 Type In MacSpice Window -> rndsrc .5m
                 Get the following
                 PWL_File.inc has been created in the MacSpice folder
  VpwlT
                 Rename file to PWL_Noise_1K1Hz.inc
             7/7
                    code for rndsrc is below
             Gnd
   7/7
          www.idea2ic.com
   Gnd
          dsauersanjose@aol.com 7.15.10_3.53PM
  VpwlT OUT
                       <== Format for piecewise linear file is as so.
            0 PWL(
            0.38156547
                           Random Noise can by generated by rndsrc
The step of time is 0.5ms and bandwidth
  + 0
  + 1.00E-06
           0.60066694
  + 2.00E-06
           0.361341313
                           of noise will therefore be at 1kHz.
       ...etc...
  + 0.000003 0.944365605
                           The total measurement time is 1s which
  + 5.16E-04 0.658730205
                           corresponds to a 1Hz resolution
                           This text file is located at the following
  Users/donsauer/Documents/MacSpice/PWL Noise 1K1Hz.inc
          start f
                  stop_f
                         step f
                                      vector [vector
                                     spec 1Hz->1kHz @ 1Hz steps
                          v(out)
   spec
  .tran TSTEP TSTOP TSTART TMAX
           _____
                              Rload
            OUT
                     0
                              1k
.include
                              PWL Noise 1K1Hz.inc
.control
=======Run for 1sec At 10KHz BW===================
             .05m
                     1
                              0
                                      .05m
tran
plot
              out
======Find Average and RMS================
let
            ave = mean(out)
echo
           "average
                       =
                            $&ave"
let
             rms = sqrt(mean(out*out))
                      $&rms"
echo
           "rms =
======Find Spectrum================
linearize
                             = "rectangular"
set
             specwindow
                                          v(OUT)
spec
                     10k
                                1
             noise per Hz = 1/sqrt(1000)
let
                               noise_per_Hz
plot
            mag(v(OUT))
                                                   loglog
.endc
.end
```

The total sample period is 1sec(1Hz)
A noise signal with 1Vrms was generated.
That corresponds to a 6Vppk signal.

0.0654902

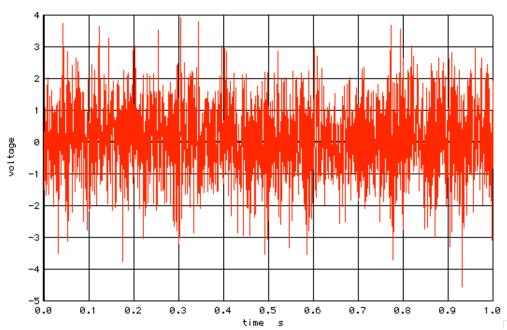
0.996786

=

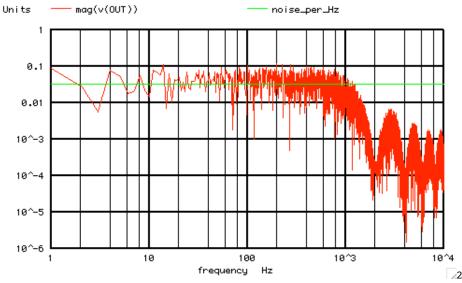
average

rms





Each sample point is 0.5msec apart (1KHz)
The transient is run at 50uec(10kHz) rate
The output is interpolated rather than sinc functions.
Harmonics (not Shown) are present in the spectrum.



1\_Vrms Noise spread our over 1000 Bins is
reduced by a factor of 1/sqrt(1000) = 32mV\_peak
Each bin has a 1Hz bandwidth.
Nyquist(-3db) is at 1KHz
Sample period is 1S (1Hz)

## ======="rndsrc" File Needs To Be In MacSpice Folder=======

```
* rndsrc -- by CDHW -- writes a gausian random voltage source
* Note: see also the frontend command 'compose'
.control
begin
   setplot new
 set outfile = "PWL_File.inc"
 if (\$argc = 2)
  let step = $argv[1]
  let duration = $argv[2]
 else
  echo "usage - rndsrc timestep duration"
  echo "effect - gaussian source written to file -- $outfile"
 unset outfile
 goto done
 endif
 set parity = true
 let time = 0
 echo "VpwlT OUT 0 PWL(" > $outfile
 while time < duration
  let time = time + step
  if $parity
    let X1 = (1+rnd(32768))/32769
    let X2 = rnd(32768)/32768*8*atan(1)
    let Vnoise = sqrt(-2*ln(X1))*cos(X2)
    set parity = false
  else
    let Vnoise = sqrt(-2*ln(X1))*sin(X2)
    set parity = true
  endif
  echo "+ $&time $&Vnoise" >> $outfile
 end
 echo "+ )" >> $outfile
 unset outfile parity
 label done
 destroy
end
echo
        "PWL File.inc has been created in the MacSpice folder"
.endc
```