


***=====The_Clipping_AM_Spectrum=====**

One would expect that clipping an AM signal should result in a pure square wave. It is possible to print out parts of the spectrum so that one no longer has to assume.

AM Clipping

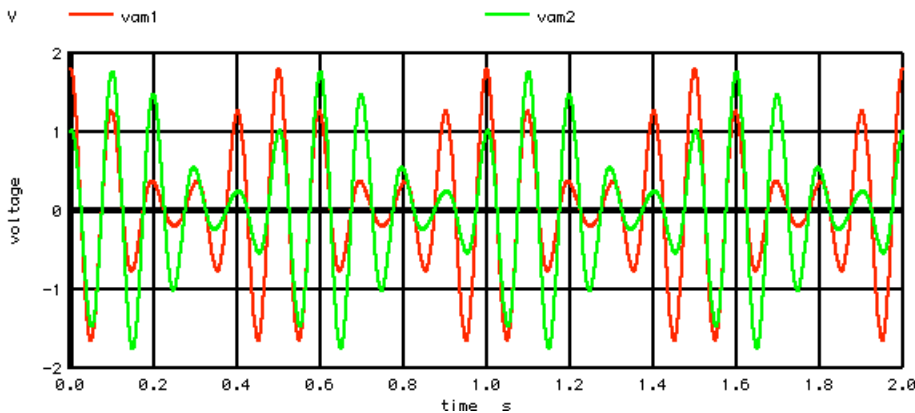
* dsauersanjose@aol.com 1/18/20
 * www.idea2ic.com replace(OPT-SPACE)=>SPACE

*  .5sidebands should product +/- 1.0radians PM
 * .3sidebands should product +/- 0.6radians PM
 * +/- (.6/6.28318)*100ms = +/- 9.5msec

***=====The SideBand Tests=====**

VT	VT	0	PWL(0	0	2	2)	DC	0
VP	VP	0	DC	3.141592653589793						
V2P	V2P	0	DC	6.283185307179586						
BREF	VREF	0	V =	cos(v(V2P)*10*v(VT))						
BAM1	VAM1	0	V =	cos(v(V2P)*10*v(VT)) +.4*cos(v(V2P)*8*v(VT)) +.4*cos(v(V2P)*12*v(VT))						
BAM2	VAM2	0	V =	cos(v(V2P)*10*v(VT)) -.4*sin(v(V2P)*8*v(VT)) +.4*sin(v(V2P)*12*v(VT))						

The two different types of Amplitude modulation are shown.



***=====Clipping_Circuit=====**

BREFC	VREFC	0	V =	2*u(v(VREF))-1		
BAM1C	VAM1C	0	V =	2*u(v(VAM1))-1		
BAM2C	VAM2C	0	V =	2*u(v(VAM2))-1		

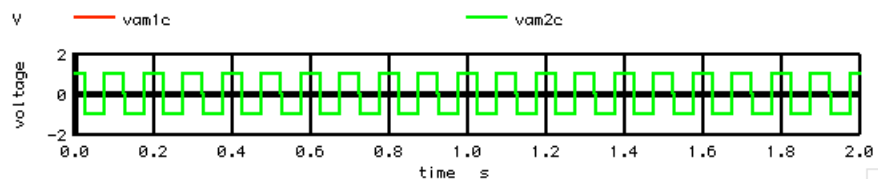
***=====Run_Sim=====**

```
.control
set pensize = 2
*TRAN TSTEP TSTOP TSTART TMAX ?UIC?
tran 1m 2 0 1m
```

***=====PlotResults=====**

```
plot vam1 vam2
plot vam1c vam2c
```

After clipping, all wave forms look like square waves.



***=====Find_Spectrum_VAM1=====**

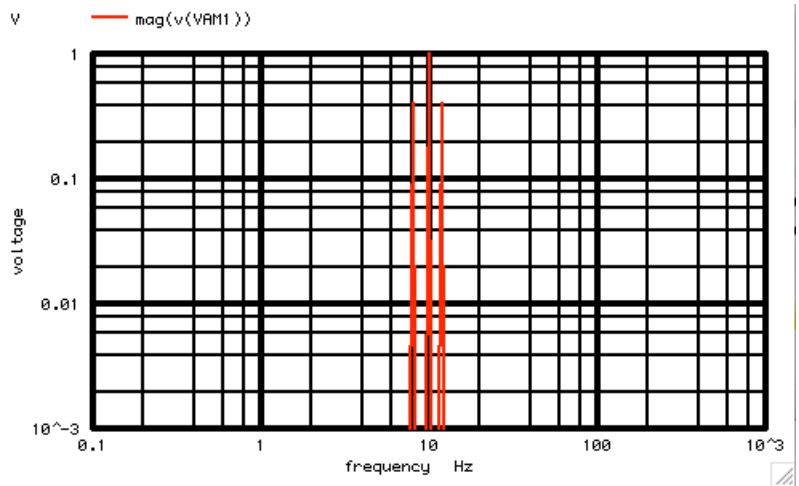
linearize

```

set          specwindow = "rectangular"
*SPEC       FSTART FSTOP  FSTEP VECTOR
spec        .5      500   .5      v(VAM1)
plot        mag(v(VAM1))  loglog  ylimit 1m 1

```

With the sidebands set to 40% of the carrier, the amplitude modulation will be at 80%.



Before clipping, the +/- side bands exist.

```

=====ReRun Simulation=====
*TRAN      TSTEP  TSTOP  TSTART TMAX  ?UIC?
tran       1m     2      0      1m

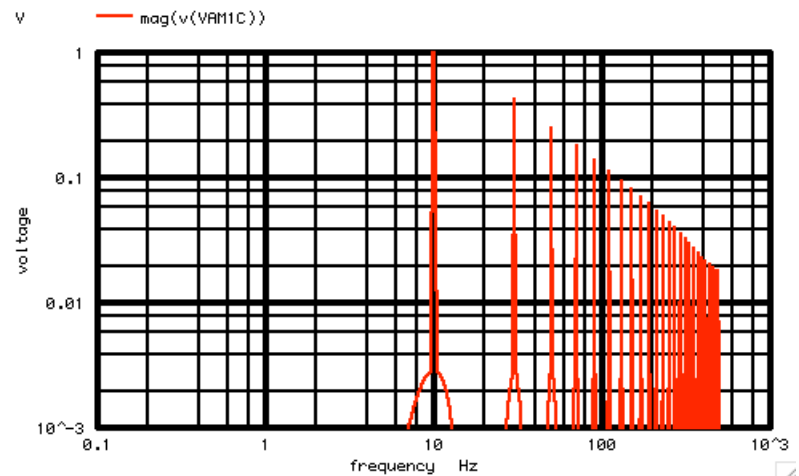
```

Transient needs to be rerun to get VAM1C.

```

=====Find Spectrum VAM1=====
linearize
set          specwindow = "rectangular"
*SPEC       FSTART FSTOP  FSTEP VECTOR
spec        .5      500   .5      v(VAM1C)
plot        mag(v(VAM1C)) loglog  ylimit 1m 1

```



It appears there is just a pure square wave. Better print out the spectrum to be sure.

```

=====Print Spectrum VAM1C=====
foreach    ii 10 20 30 40 50 60 70
let i =    $ii*2 -1
let fr=    frequency[i]
let        vfftr = real(v(VAM1C)[i])
let        vffti = imag(v(VAM1C)[i])

```

