


=====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

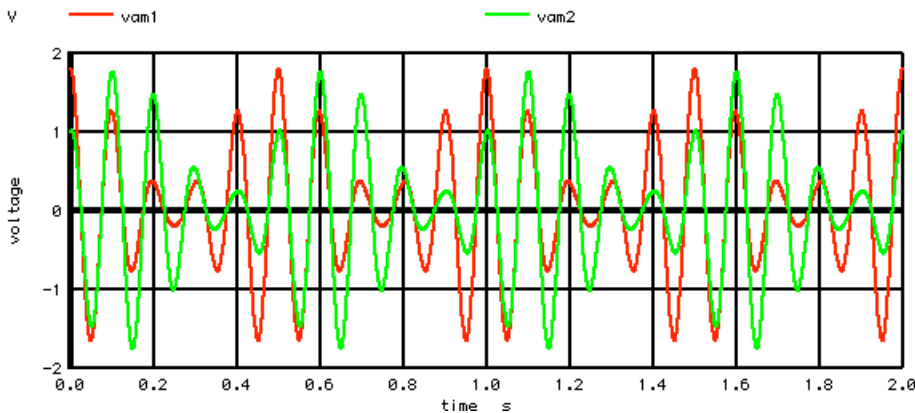
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 * www.idea2ic.com replace(OPT-SPACE)=>SPACE

*  .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 | | |

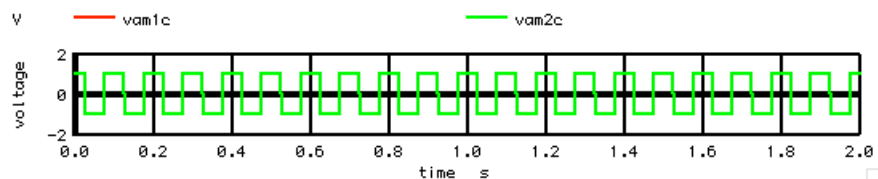
=====Run_Sim=====

```
.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=====

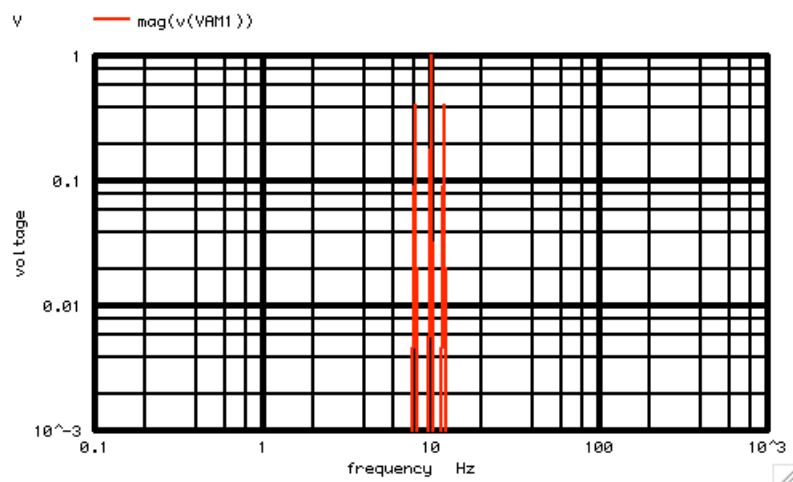
linearize

```

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

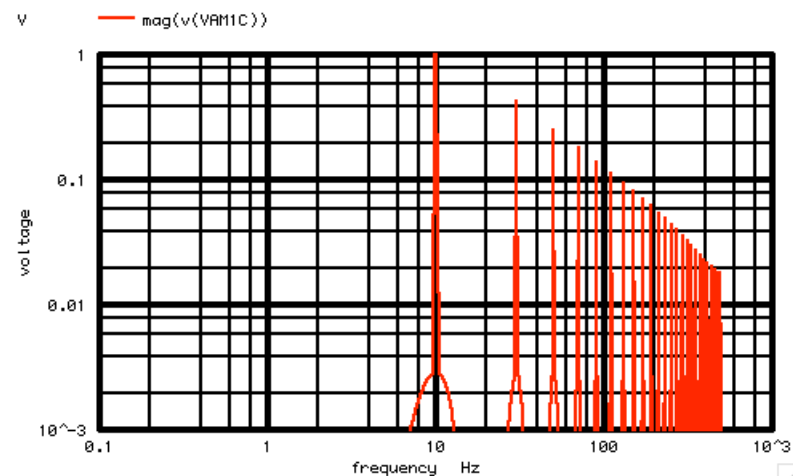
```

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])

```

