

ANEXO

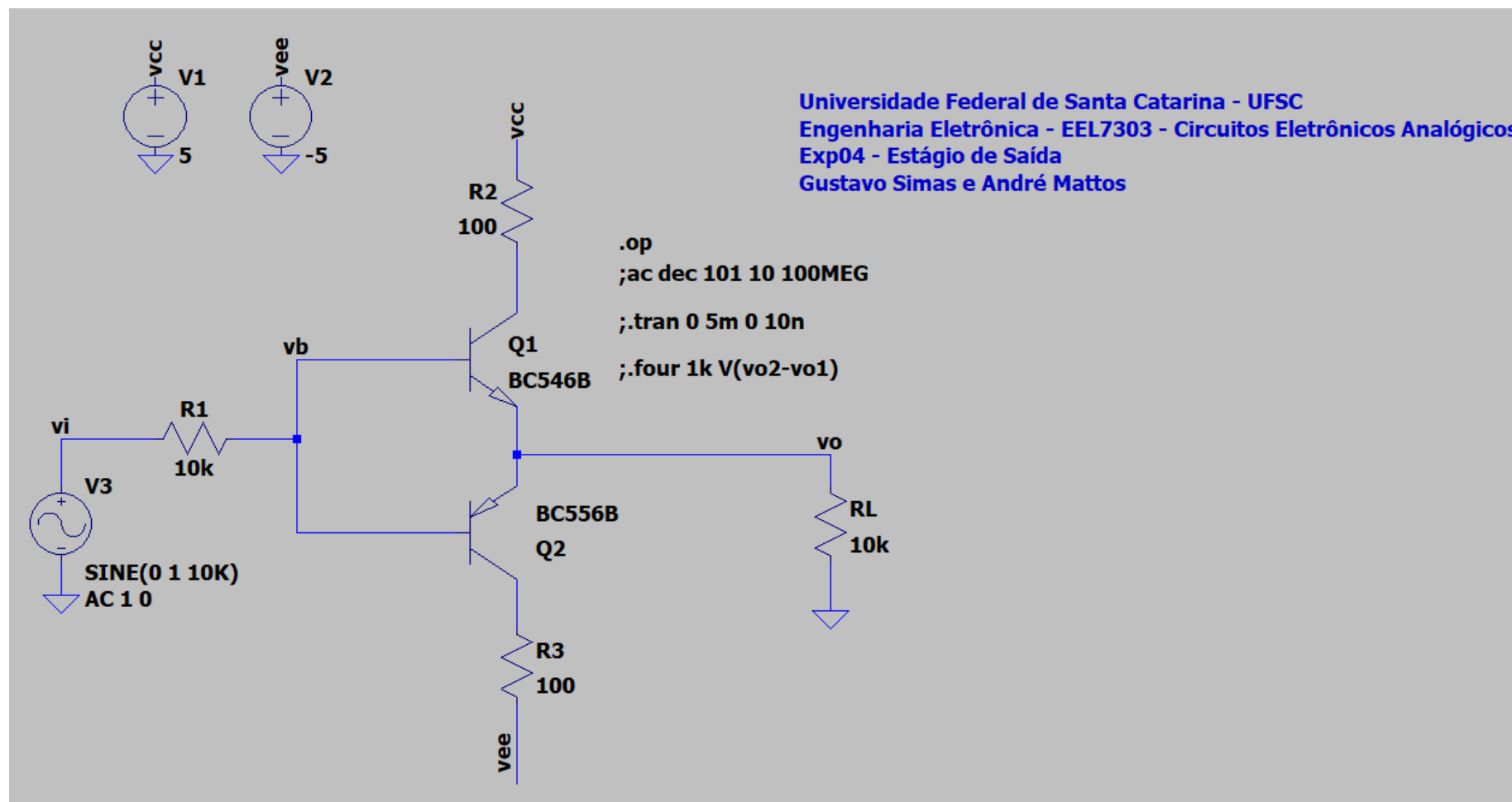


Figura 1 - Circuito Simulado em LTSpice Classe B

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--- Operating Point ---

V(n001) :      5          voltage
V(vb) :    -2.21873e-009 voltage
V(vo) :    -2.15807e-010 voltage
V(n002) :     -5          voltage
V(vi) :      0          voltage
V(vcc) :      5          voltage
V(vee) :     -5          voltage
Ic(Q2) :   -5.33405e-012 device_current
Ib(Q2) :    5.28758e-012 device_current
Ie(Q2) :    4.73715e-014 device_current
Ic(Q1) :    5.09083e-012 device_current
Ib(Q1) :   -5.06571e-012 device_current
Ie(Q1) :   -2.57908e-014 device_current
I(R3) :    5.3346e-012  device_current
I(Rl) :   -2.15807e-014 device_current
I(R2) :   -5.09081e-012 device_current
I(Rl) :   -2.21873e-013 device_current
I(V3) :   -2.21873e-013 device_current
I(V2) :    5.33459e-012 device_current
I(Vl) :   -5.09081e-012 device_current

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Figura 2 - Ponto Quiescente Simulado Classe B

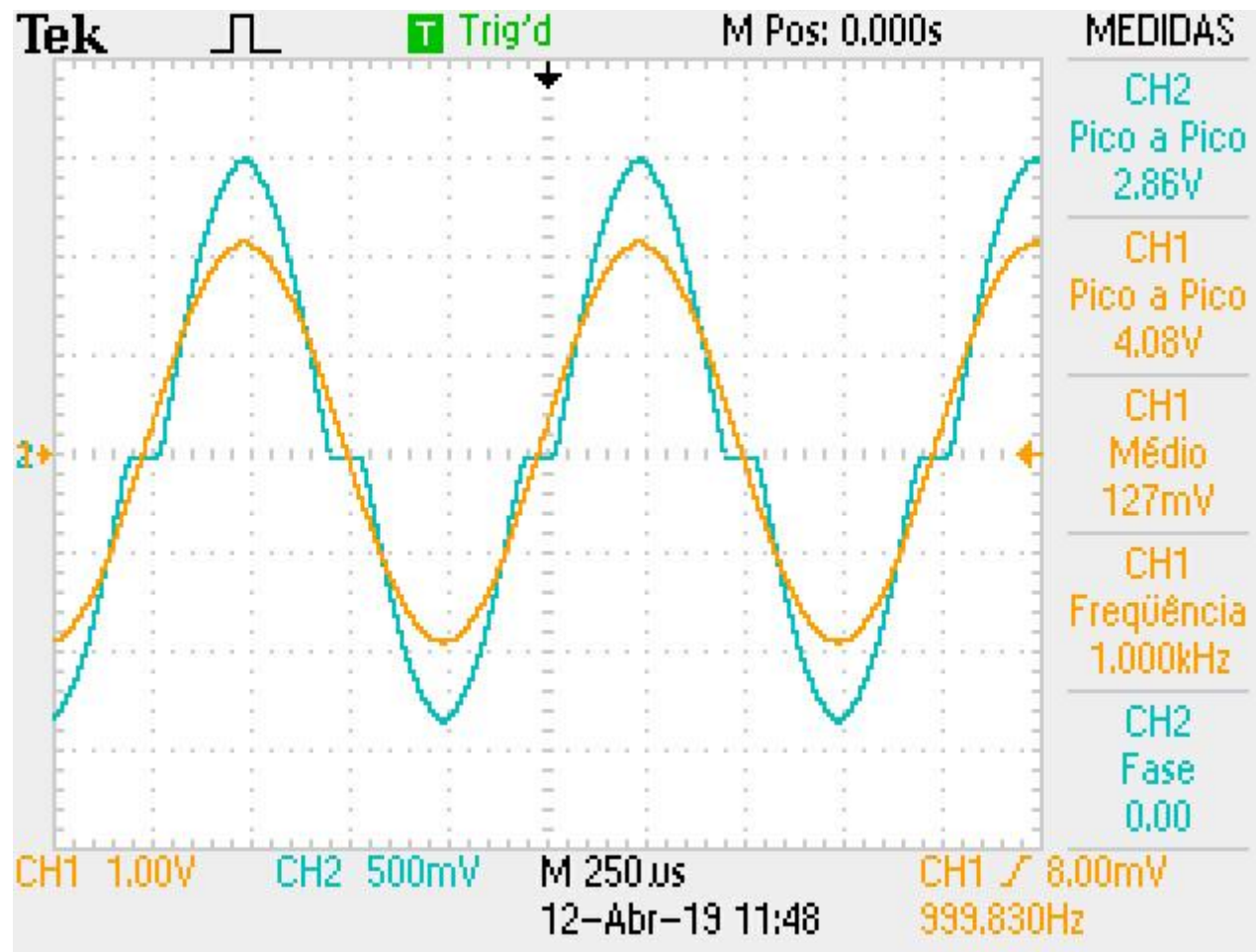


Figura 3 - Distorção de cruzamento experimental Classe B

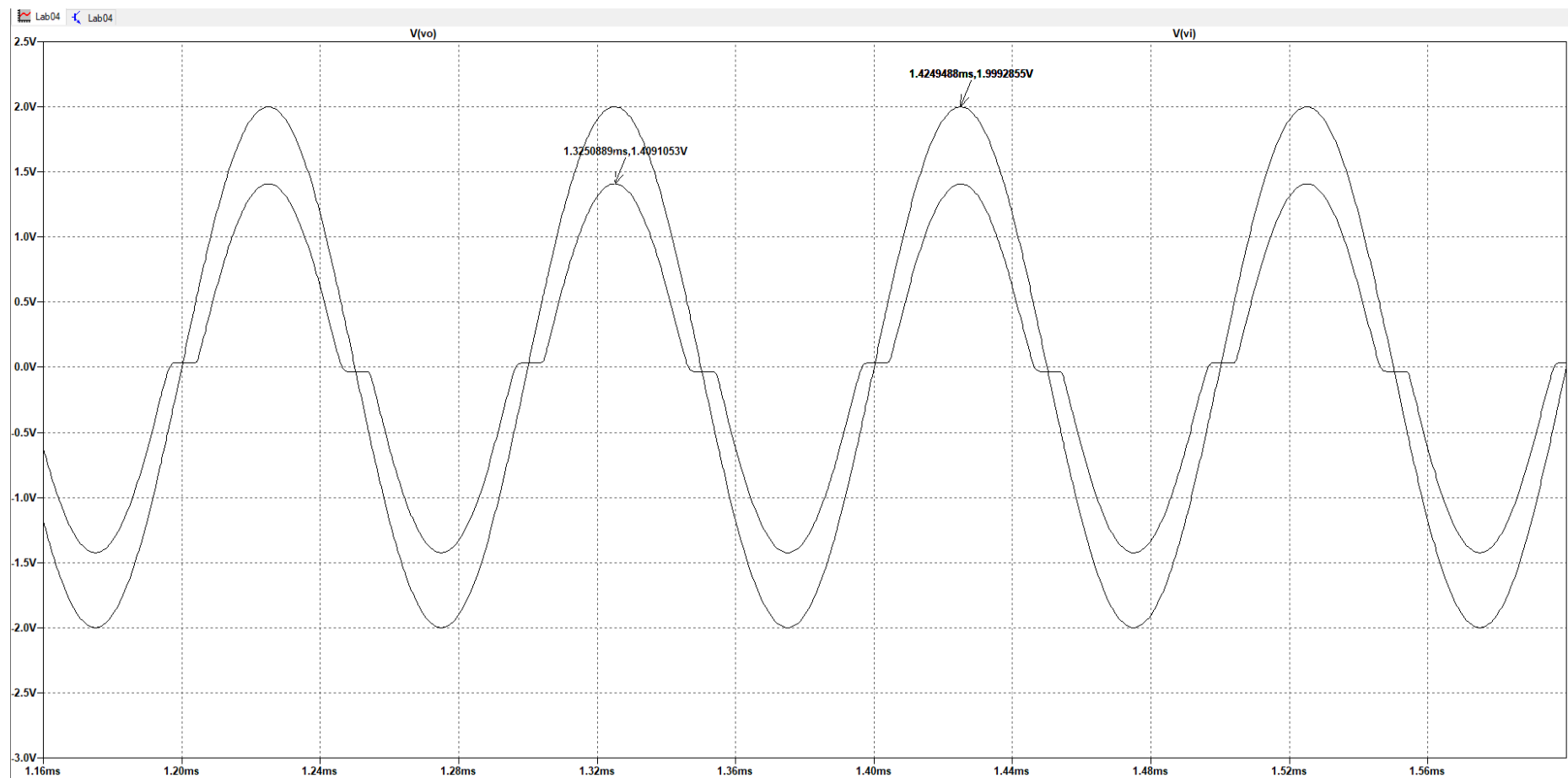


Figura 4 - Distorção de cruzamento simulado Classe B

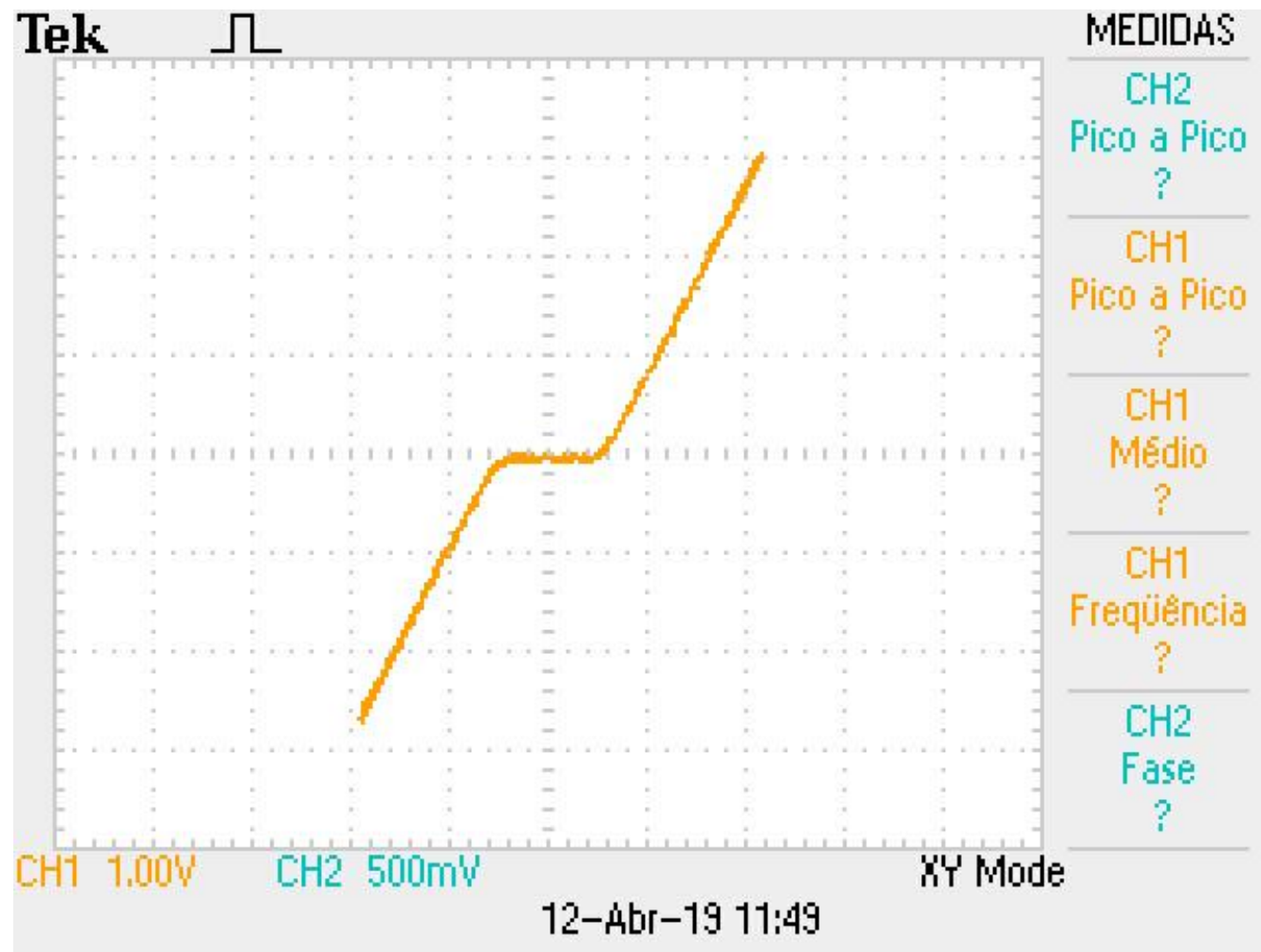


Figura 5 - Modo X-Y experimental Classe B

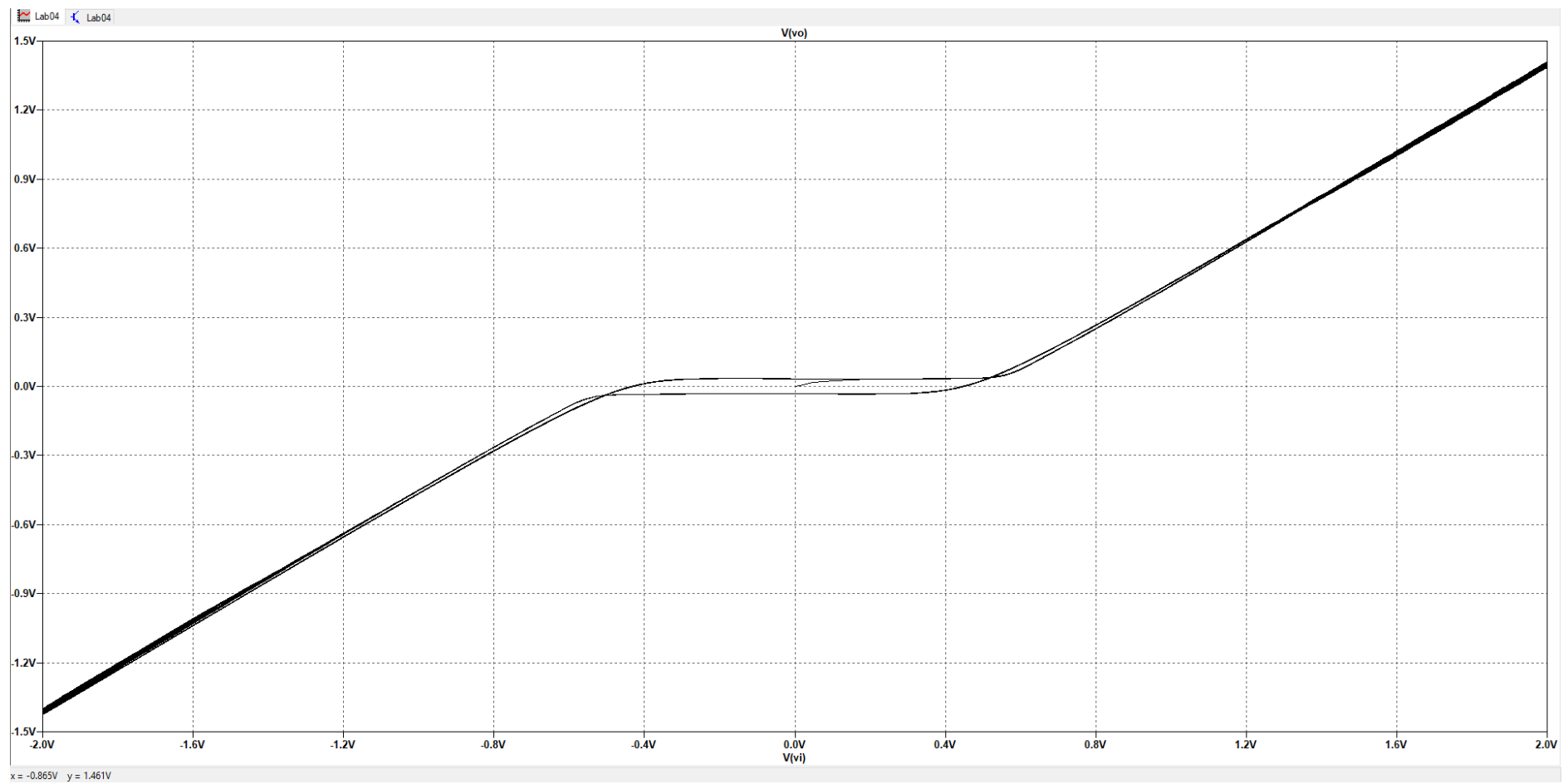


Figura 6 - Modo X-Y simulado Classe B

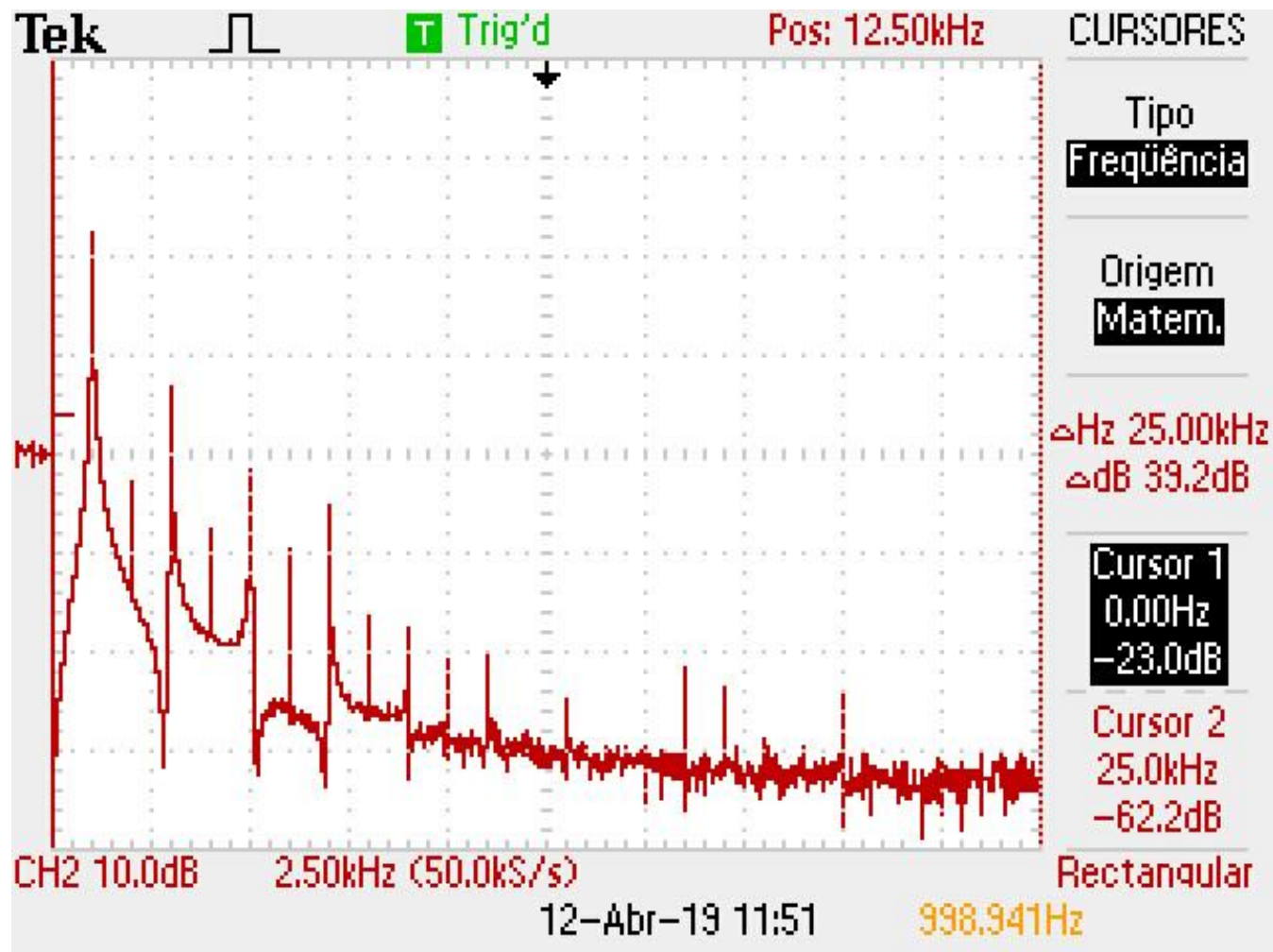


Figura 7 - Espectro de frequência experimental do sinal de saída Classe B

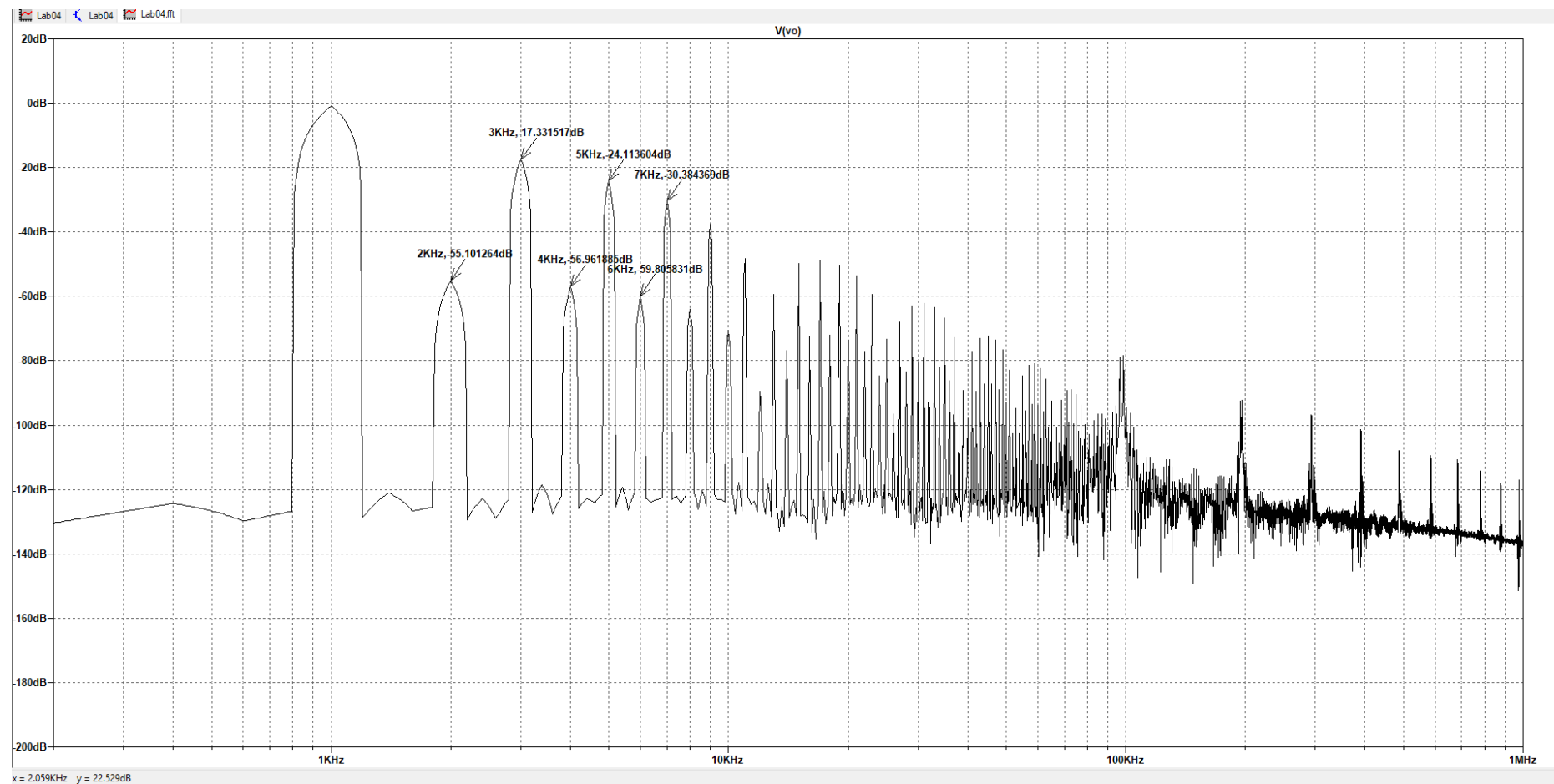


Figura 8 - Espectro de frequência simulado do sinal de saída Classe B

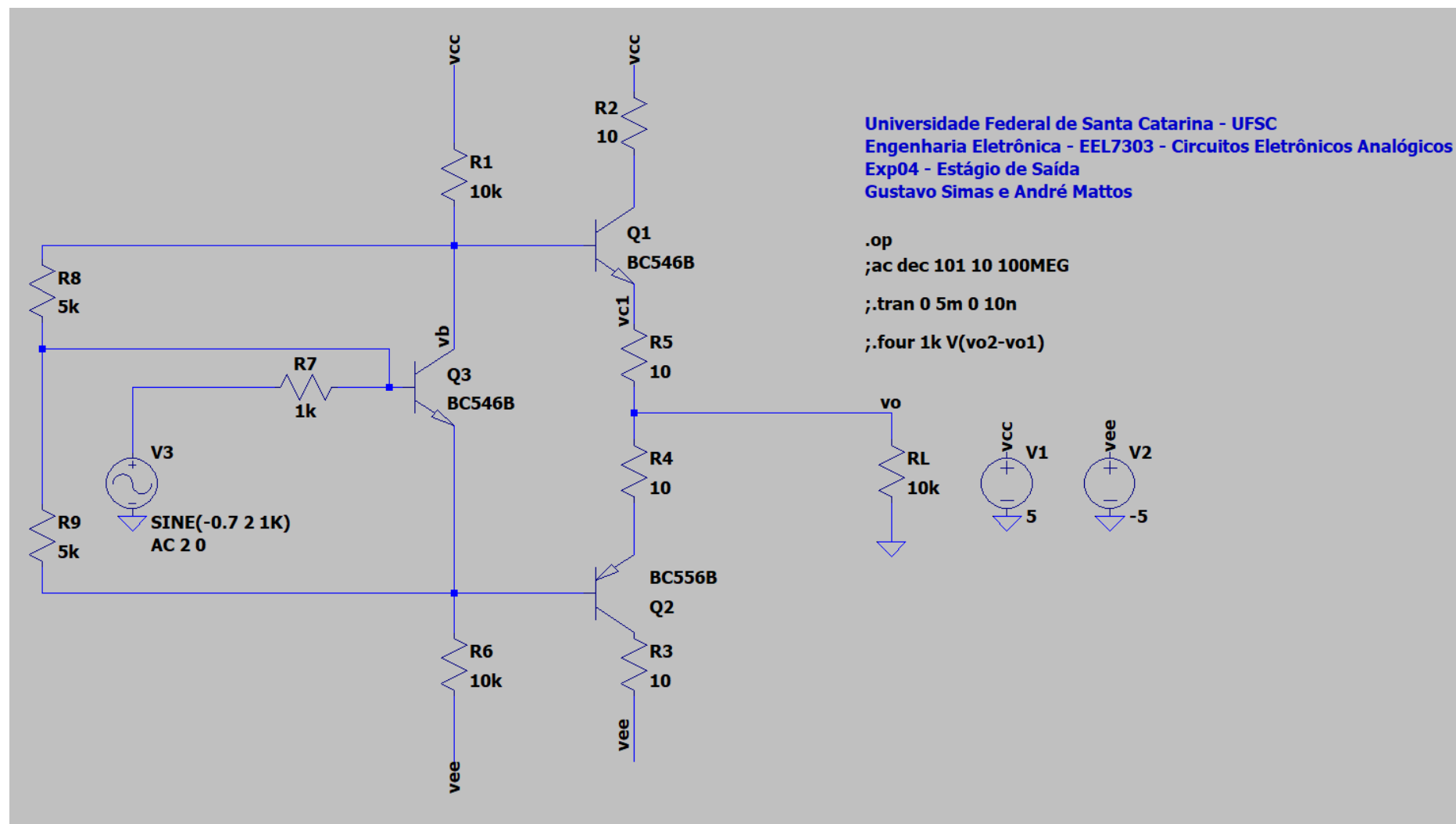


Figura 9 - Circuito simulado em LTSpice Classe AB

--- Operating Point ---		
V(n001) :	4.90015	voltage
V(vb) :	0.373311	voltage
V(vcl) :	-0.329691	voltage
V(p001) :	-4.89966	voltage
V(n005) :	-1.22123	voltage
V(n004) :	-0.530514	voltage
V(vcc) :	5	voltage
V(vee) :	-5	voltage
V(vo) :	-0.429887	voltage
V(n002) :	-0.6217	voltage
V(n003) :	-0.7	voltage
Ic(Q2) :	-0.0100342	device_current
Ib(Q2) :	-2.84204e-005	device_current
Ie(Q2) :	0.0100626	device_current
Ic(Q3) :	0.000228754	device_current
Ib(Q3) :	7.96474e-007	device_current
Ie(Q3) :	-0.00022955	device_current
Ic(Q1) :	0.00998474	device_current
Ib(Q1) :	3.49127e-005	device_current
Ie(Q1) :	-0.0100197	device_current
I(R8) :	0.000199002	device_current
I(R9) :	0.000119906	device_current
I(R7) :	7.82997e-005	device_current
I(R6) :	0.000377877	device_current
I(R1) :	0.000462669	device_current
I(R5) :	0.0100197	device_current
I(R4) :	0.0100626	device_current
I(R3) :	0.0100342	device_current
I(R1) :	-4.29887e-005	device_current
I(R2) :	-0.00998474	device_current
I(V3) :	7.82997e-005	device_current
I(V2) :	0.0104121	device_current
I(V1) :	-0.0104474	device_current

Figura 10 - Ponto Quiescente Simulado Classe AB

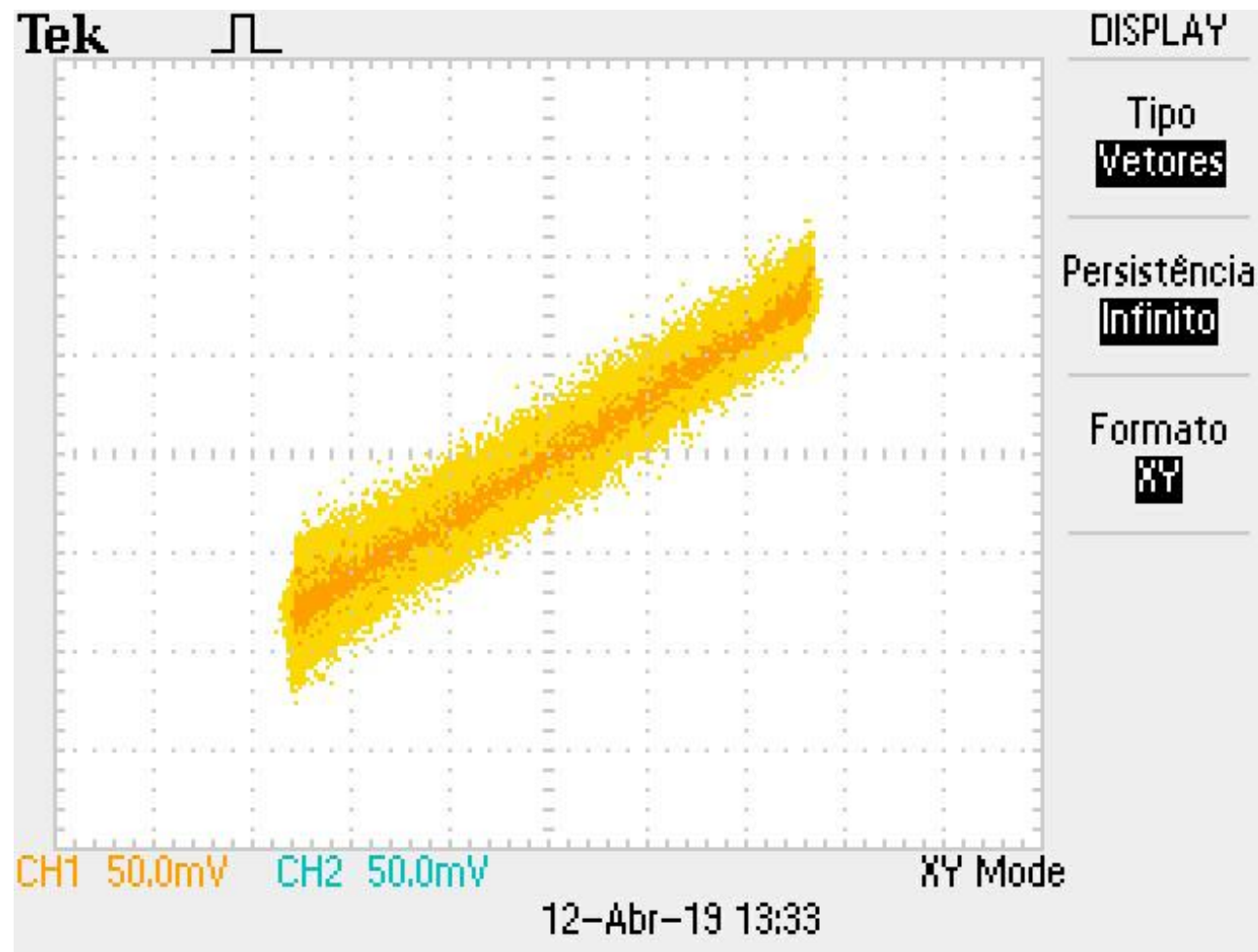


Figura 11 - Modo X-Y experimental entre nós H e I Classe AB

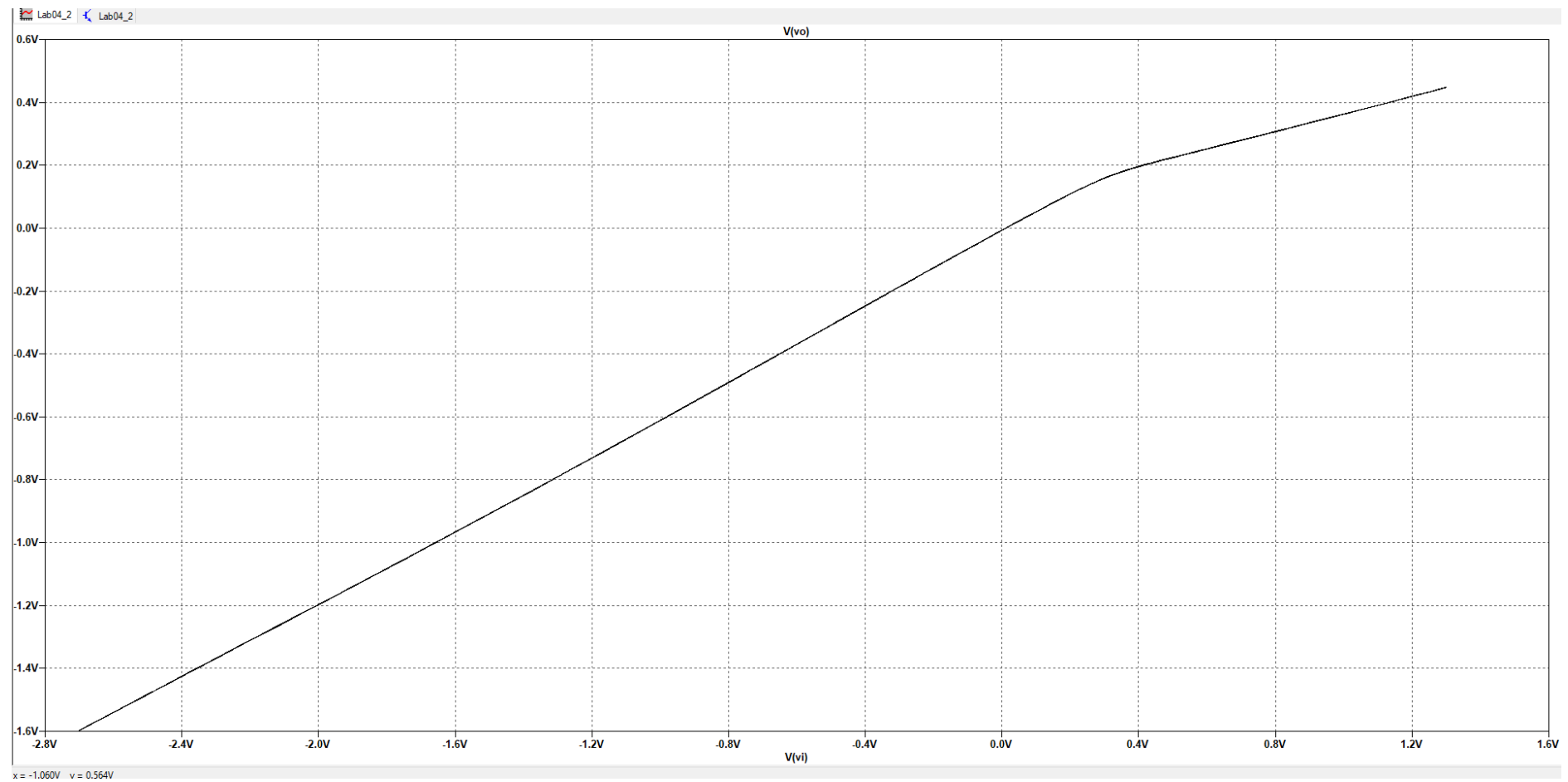


Figura 12 - Modo X-Y simulado entre nós H e I Classe AB

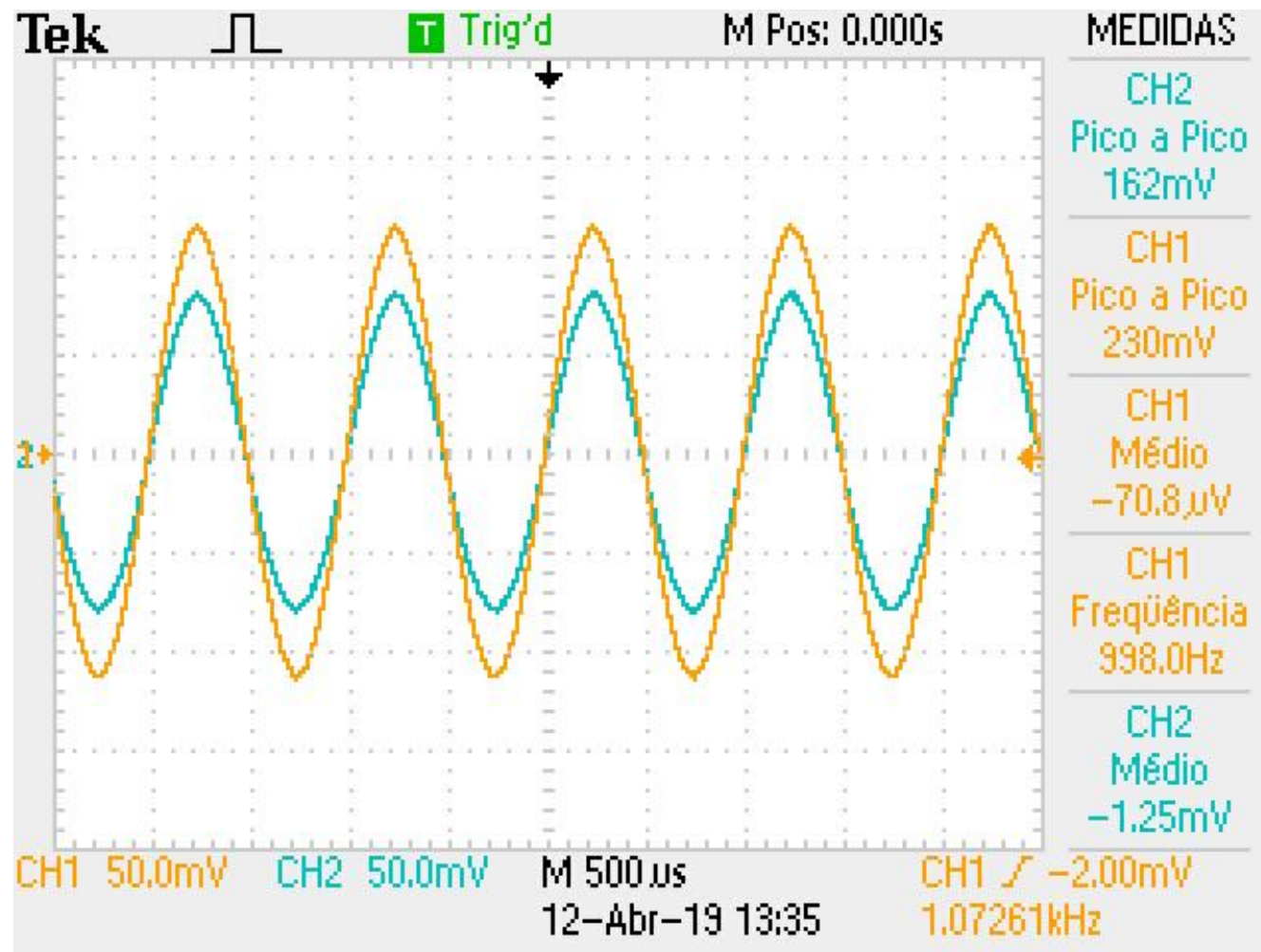


Figura 13 - Modo Y-T experimental entre pontos S e H Classe AB

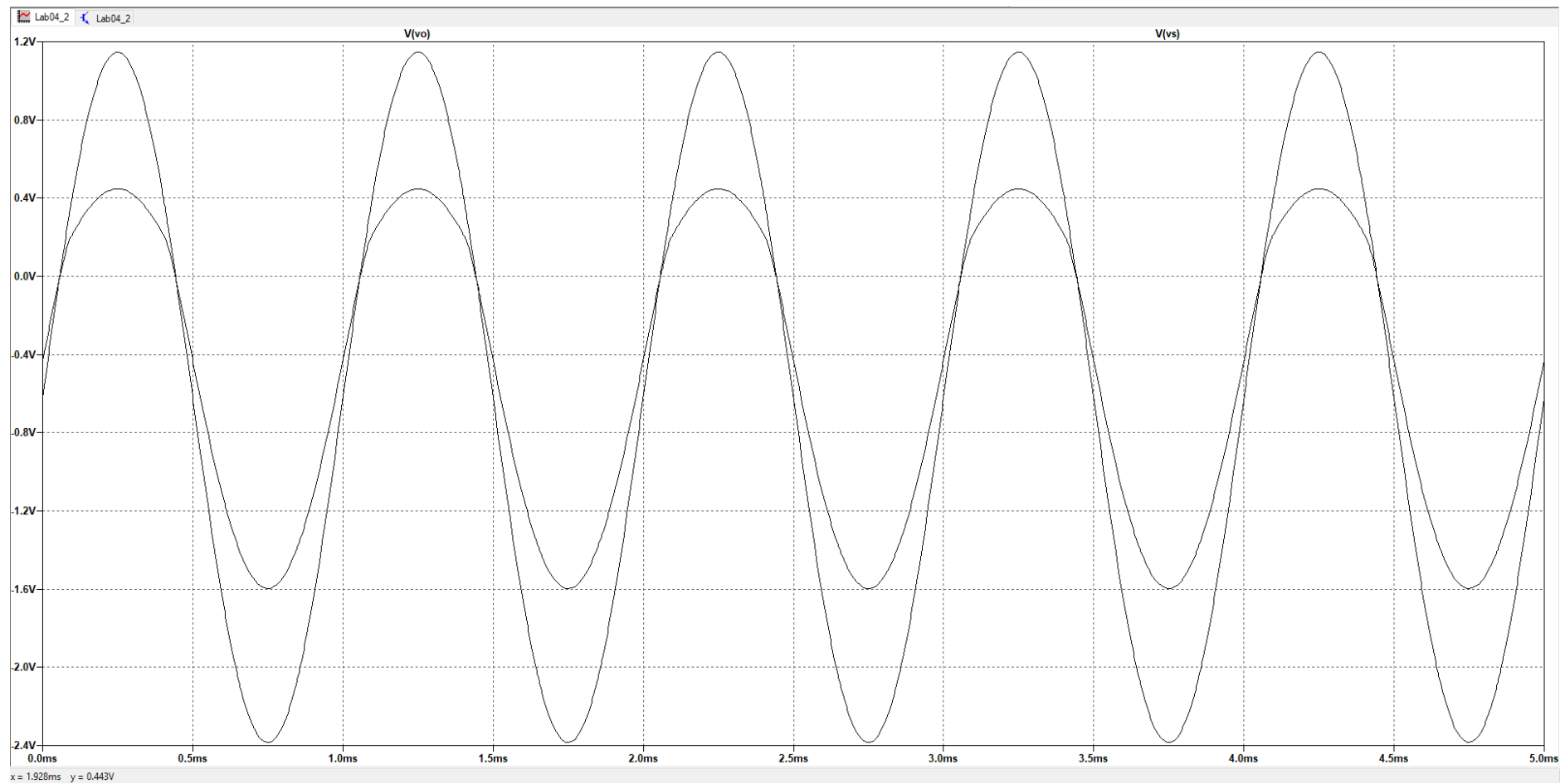


Figura 14 - Modo Y-T simulado entre pontos S e H Classe AB

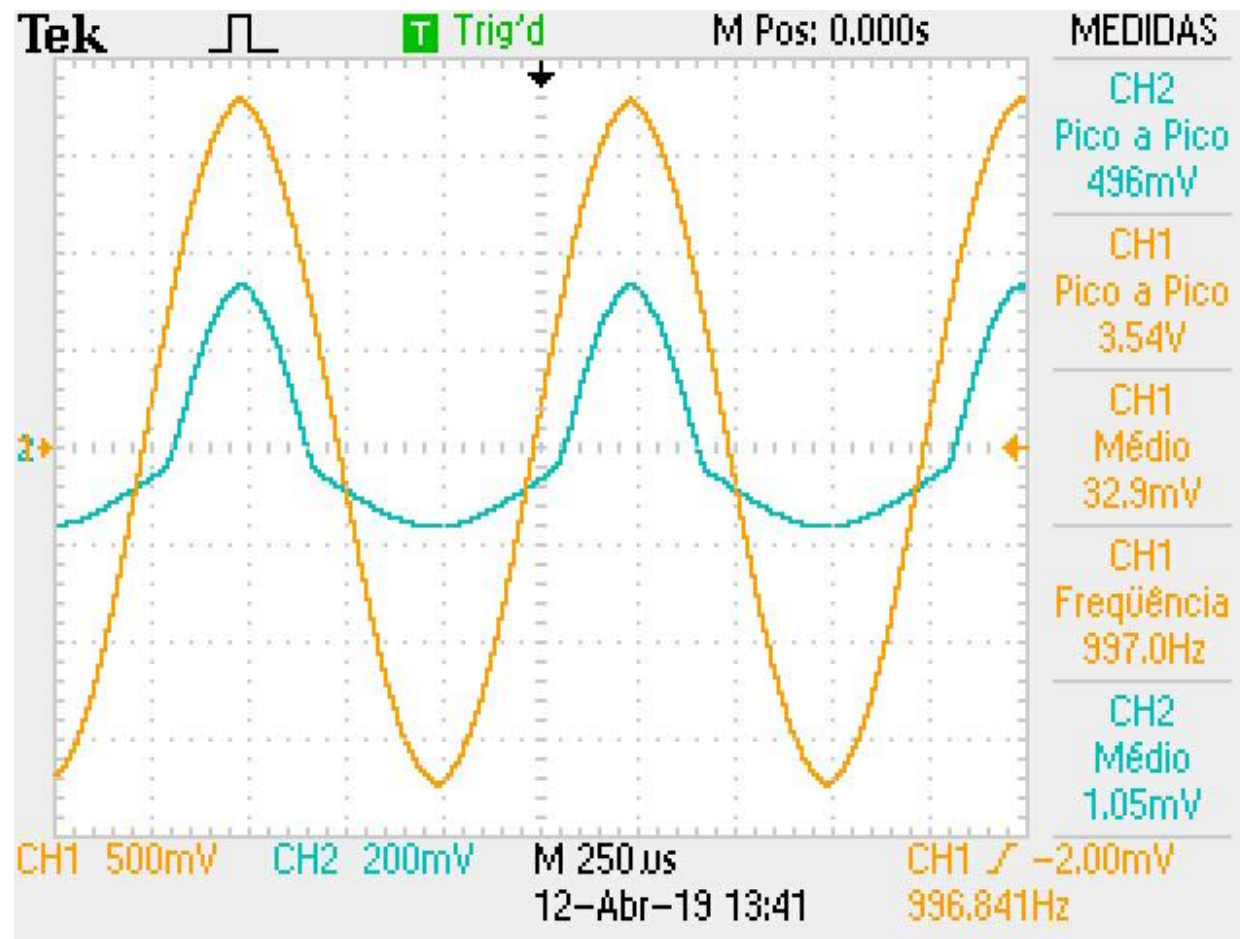


Figura 15 - Modo Y-T experimental para alta amplitude à entrada Classe AB

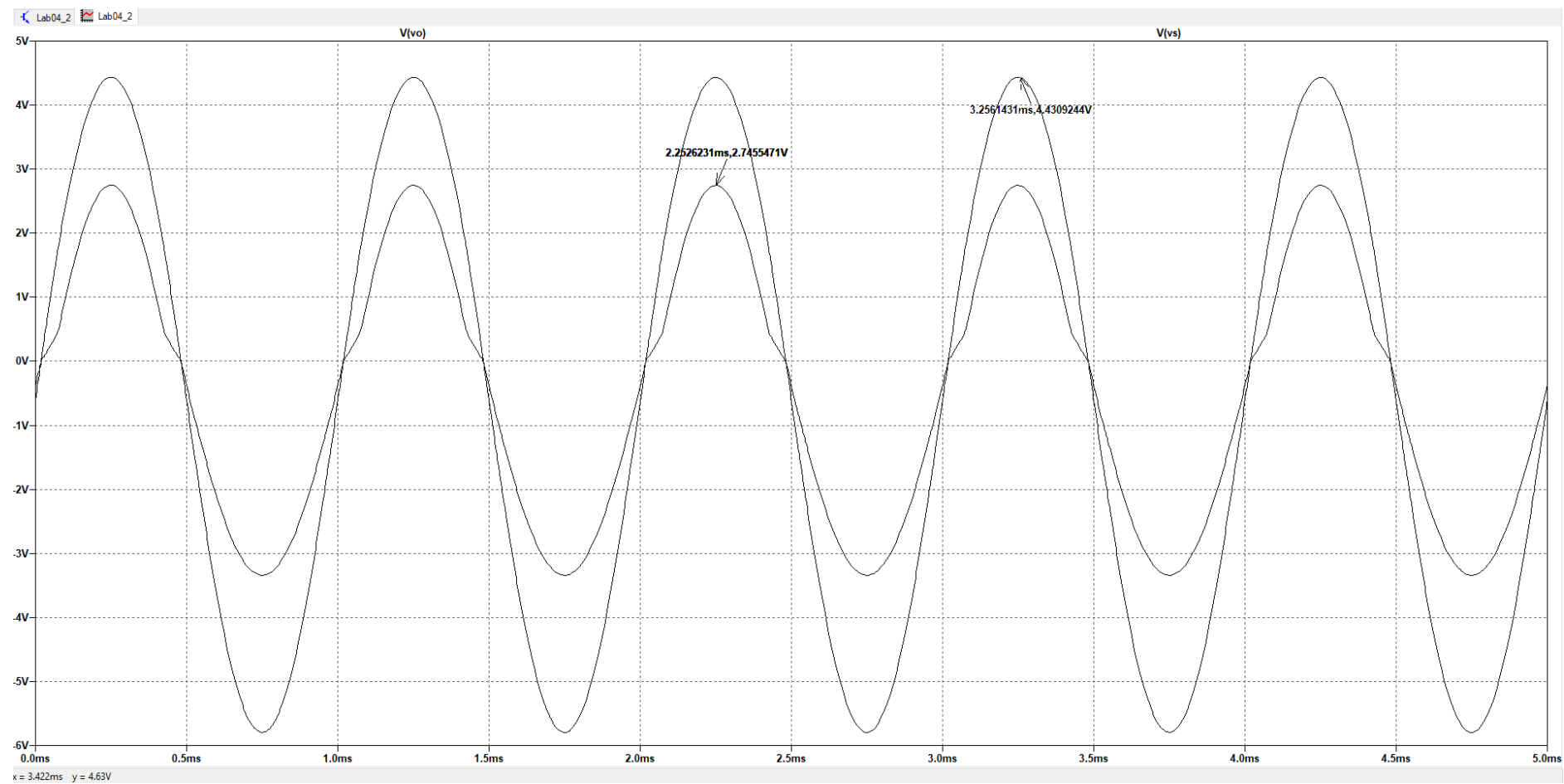


Figura 16 - Modo Y-T simulado para alta amplitude à entrada Classe AB

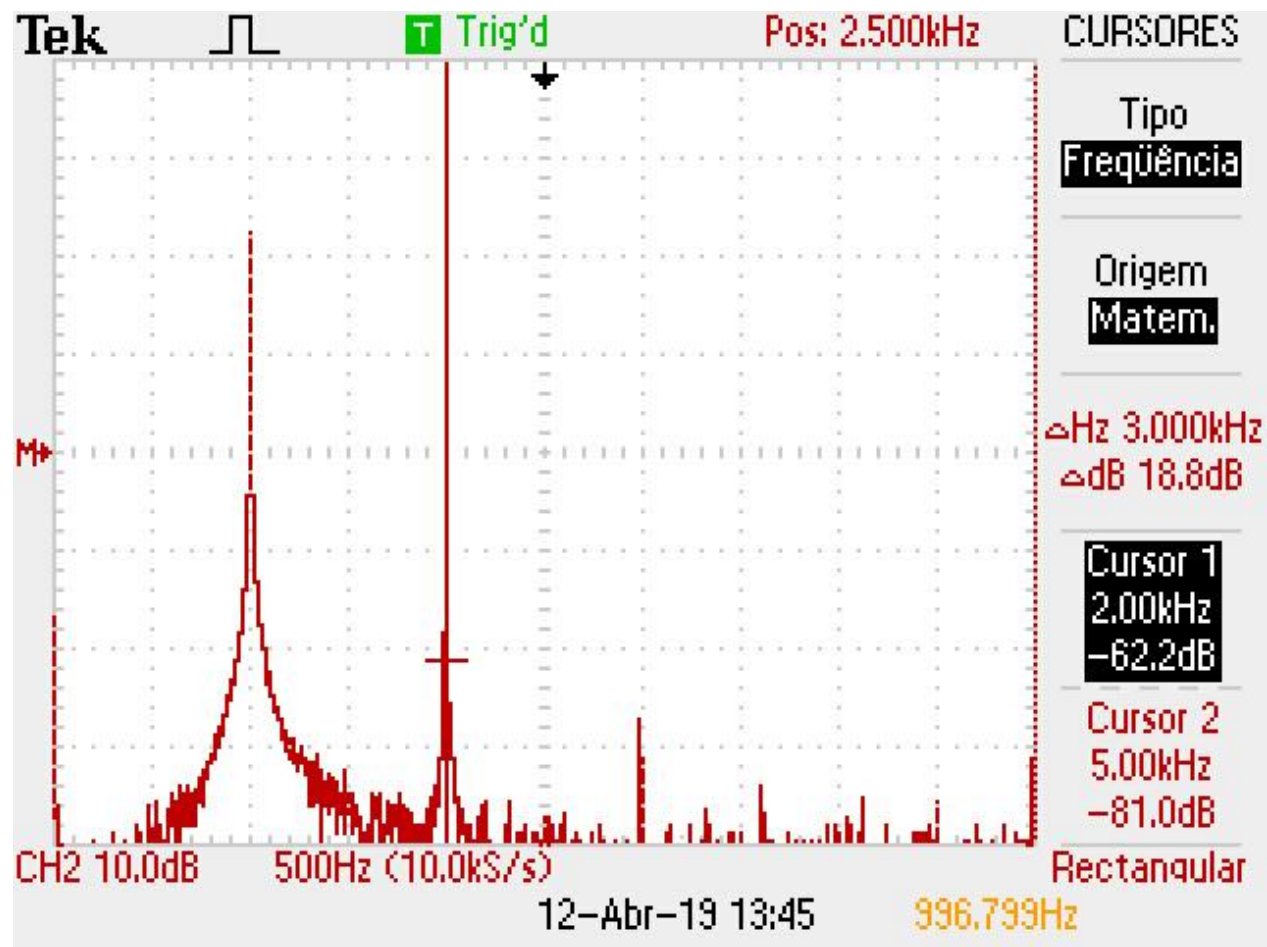


Figura 17 - Espectro de frequência experimental do sinal de saída Classe AB

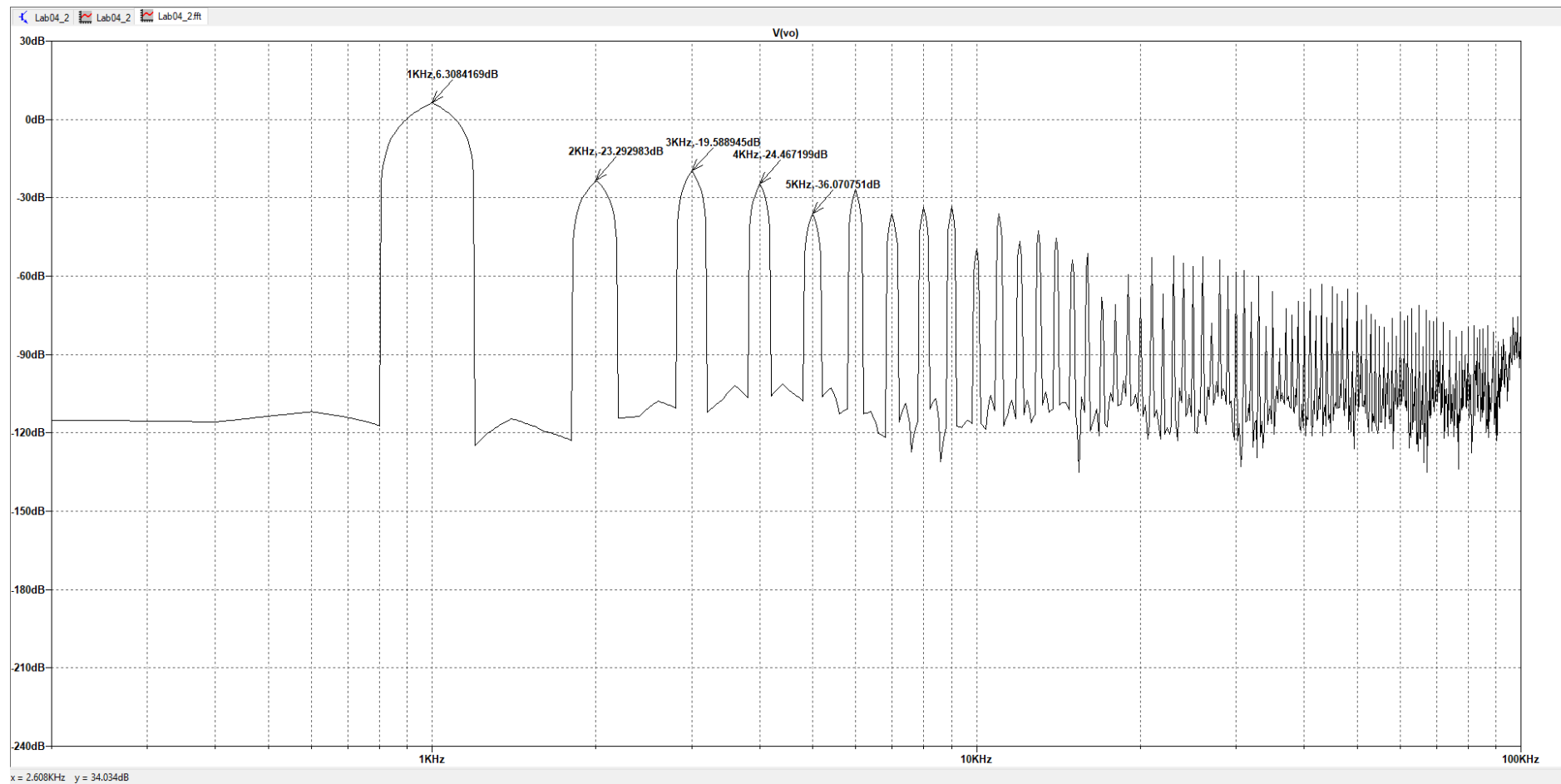


Figura 18 - Espectro de frequência simulado do sinal de saída Classe AB

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Circuit: * D:\Usuário\Documents\GitHub\EEL7303\Laboratorios\LAB04\Simulação\Lab04_2.asc

Direct Newton iteration for .op point succeeded.
N-Period=1
Fourier components of V(vo)
DC component:-0.439074

Harmonic      Frequency      Fourier      Normalized      Phase      Normalized
Number        [Hz]          Component    Component       [degree]    Phase [deg]
1             1.000e+03     2.924e+00    1.000e+00       -0.01°      0.00°
2             2.000e+03     9.679e-02    3.311e-02       -90.01°     -90.00°
3             3.000e+03     1.483e-01    5.072e-02       -179.97°    -179.96°
4             4.000e+03     8.455e-02    2.892e-02        90.09°      90.10°
5             5.000e+03     2.224e-02    7.607e-03       -179.70°    -179.70°
6             6.000e+03     6.407e-02    2.191e-02        90.08°      90.09°
7             7.000e+03     2.222e-02    7.600e-03       -0.01°     -0.01°
8             8.000e+03     2.971e-02    1.016e-02        90.22°      90.23°
9             9.000e+03     3.003e-02    1.027e-02        0.03°       0.04°

Total Harmonic Distortion: 7.286267%(7.350504%)

Date: Wed Apr 24 09:55:59 2019
Total elapsed time: 15.680 seconds.

tnom = 27
temp = 27
method = modified trap
totiter = 1000042
traniter = 1000034
tranpoints = 500018
accept = 500018
rejected = 0
matrix size = 23
fillins = 20
solver = Normal
Matrix Compiler1: 2.66 KB object code size 0.3/0.2/[0.2]
Matrix Compiler2: off [0.1]/0.2/0.1

```

Figura 19 - Análise de THD simulado Classe AB

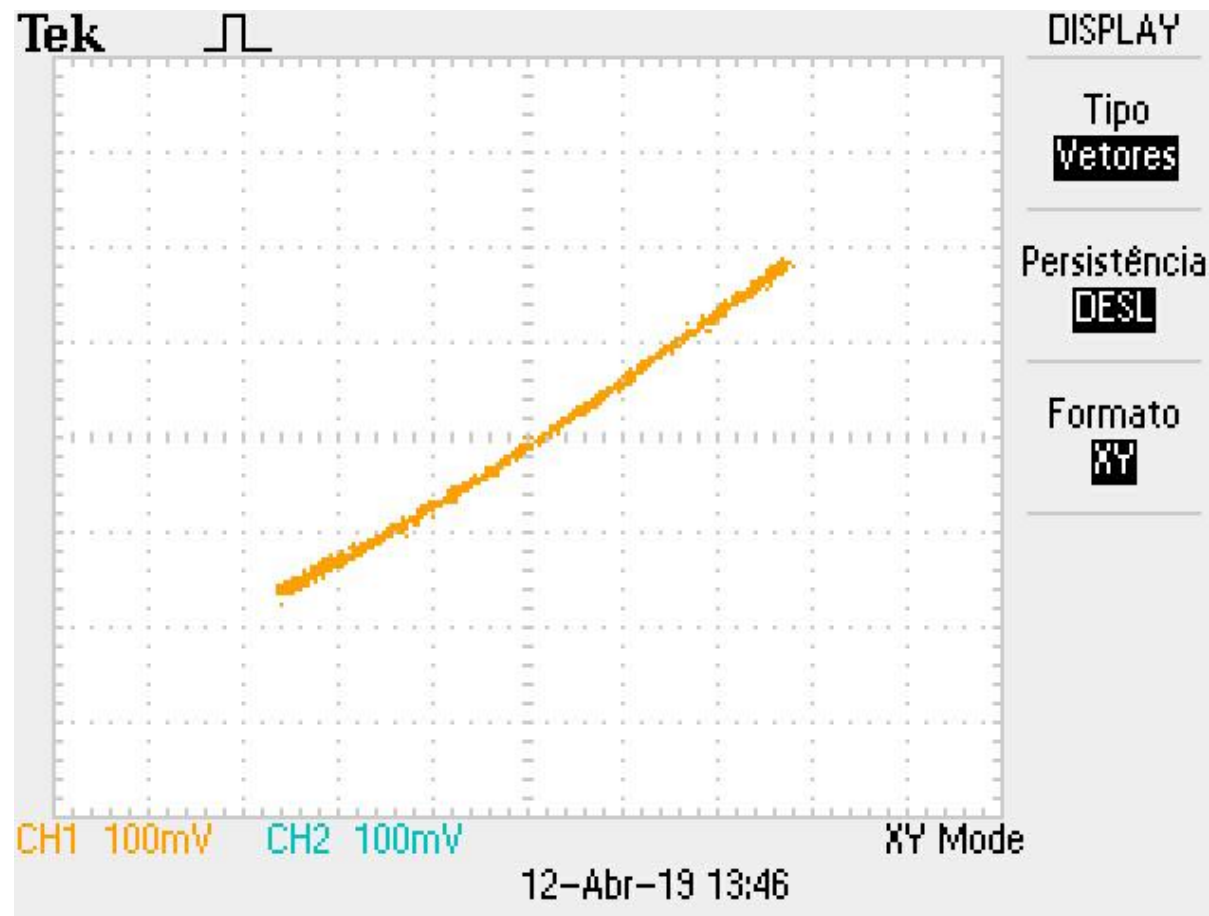


Figura 20 - Modo X-Y experimental de circuito com capacitor Classe AB

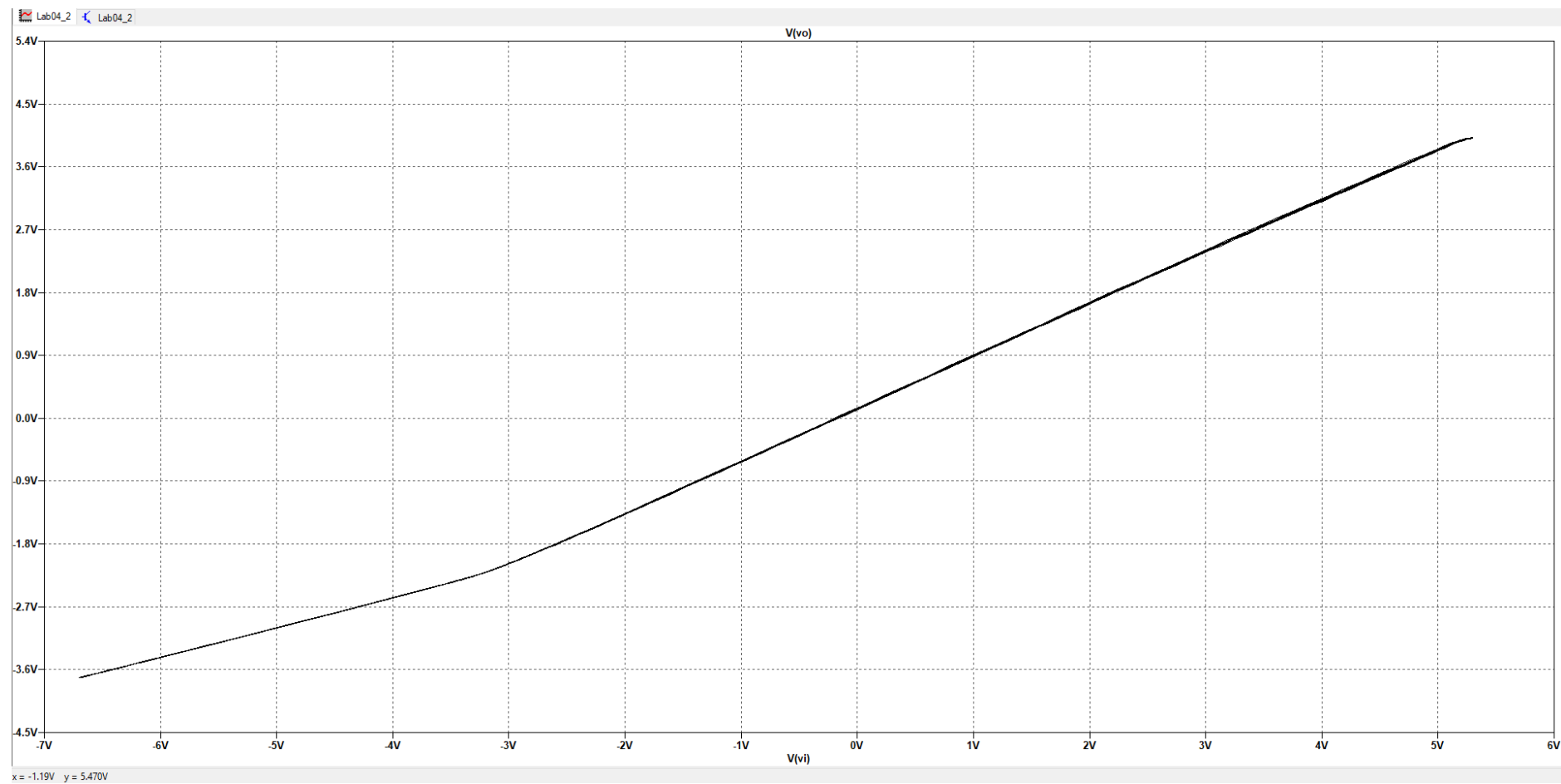


Figura 21 - Modo X-Y simulado de circuito com capacitor Classe AB

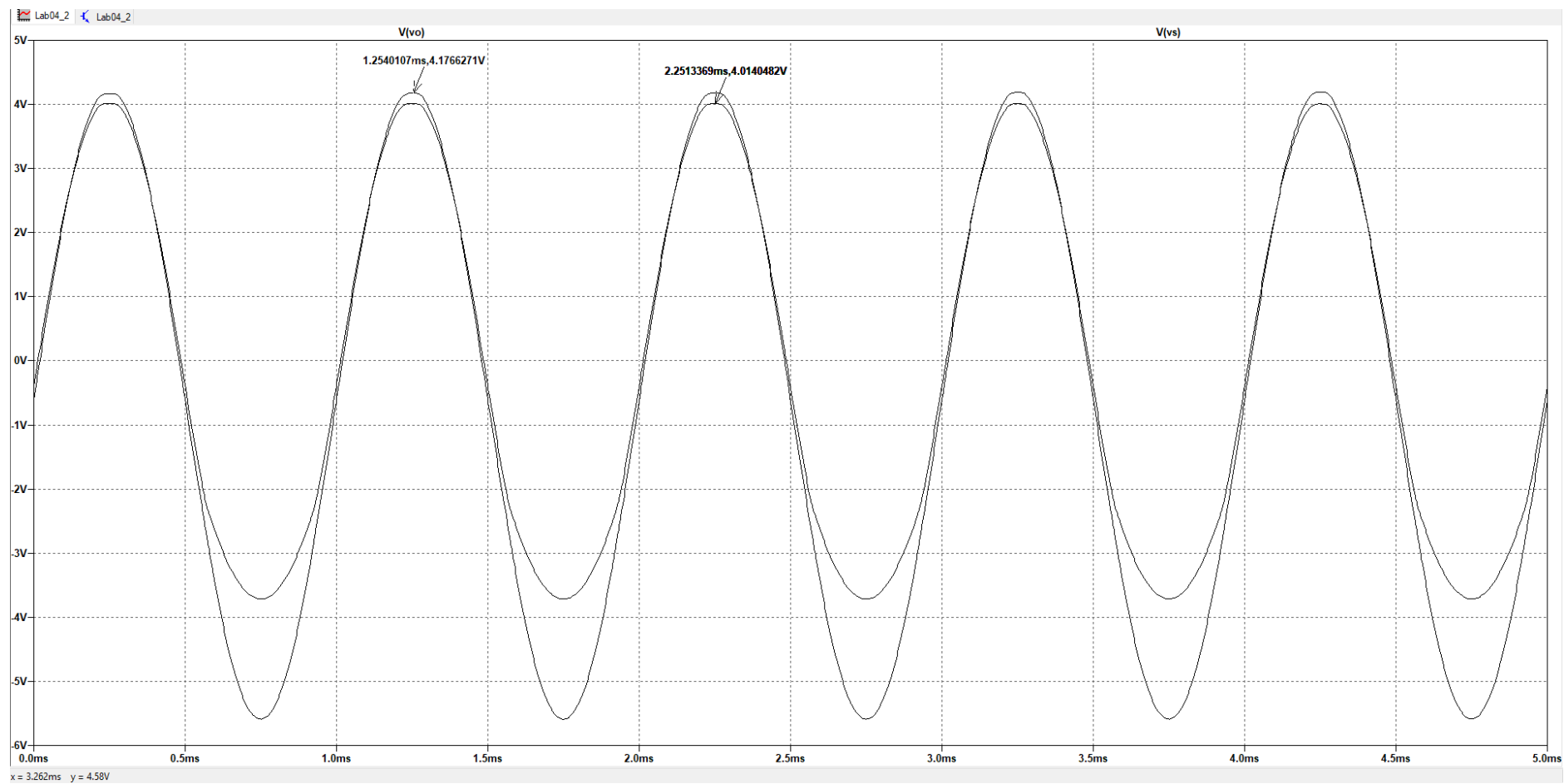


Figura 22 - Modo Y-T simulado de circuito com capacitor Classe AB