# ANEXO

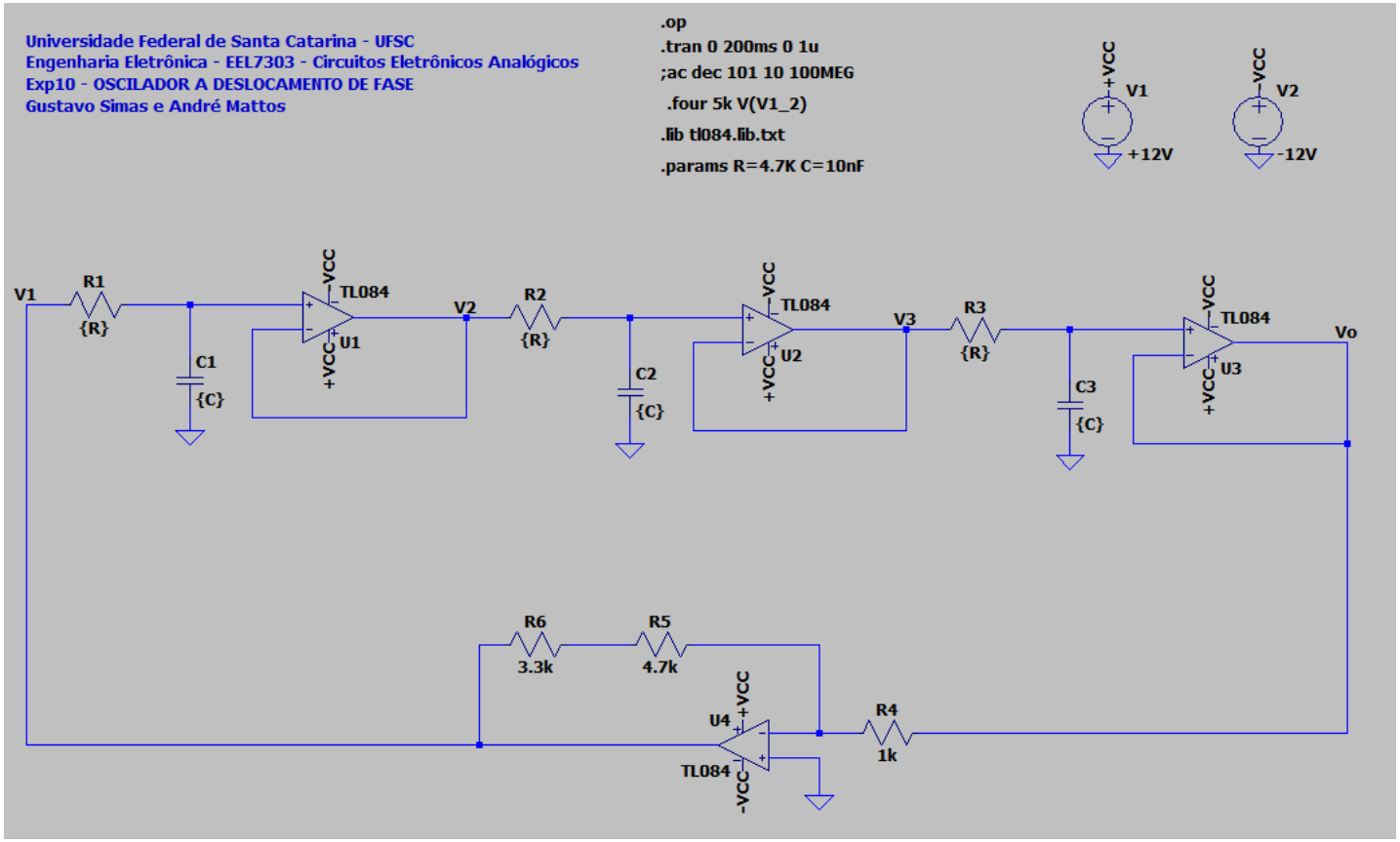


Figura 1 - Circuito Simulado em LTSpice

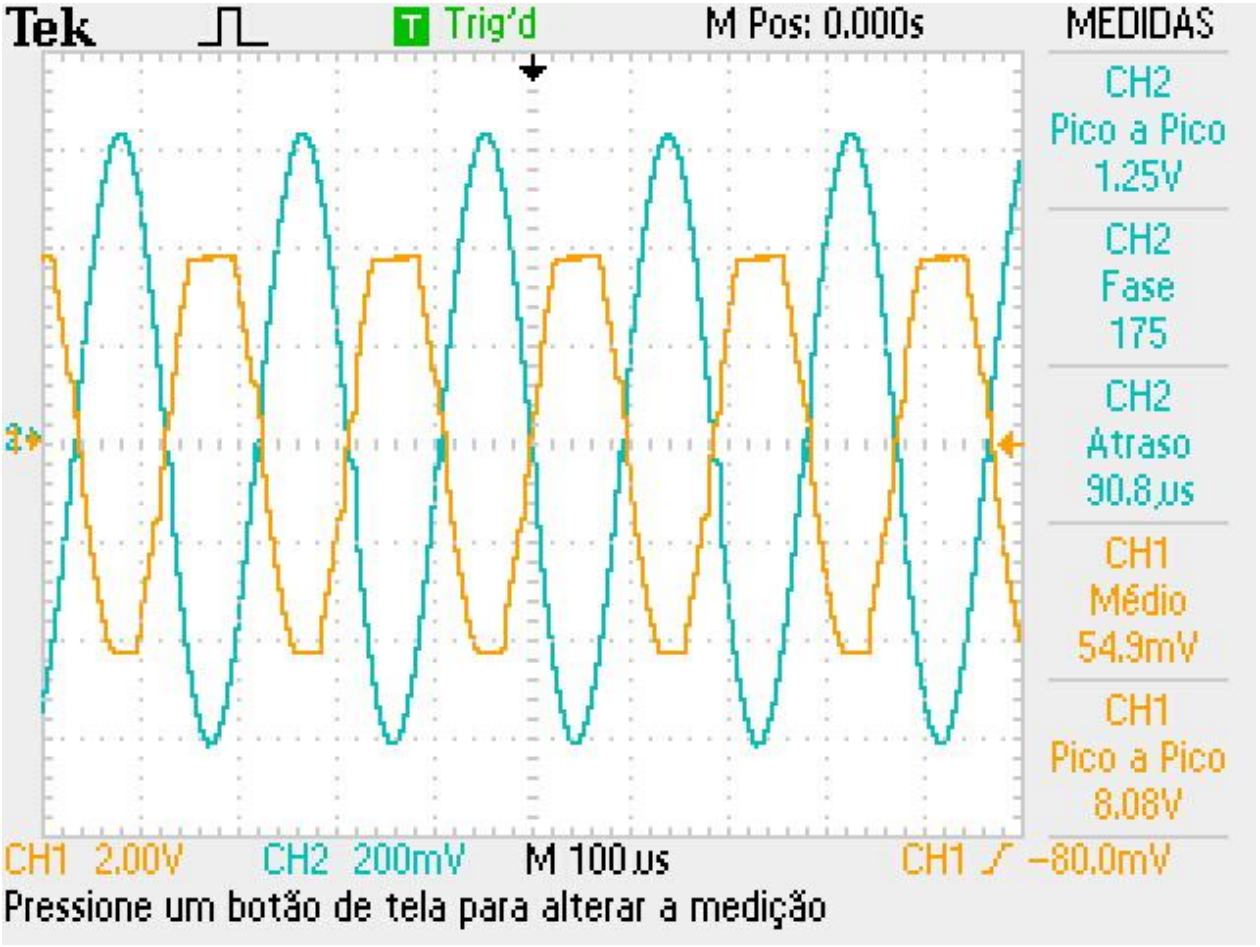


Figura 2 - Ponto mínimo para oscilação sustentável experimental

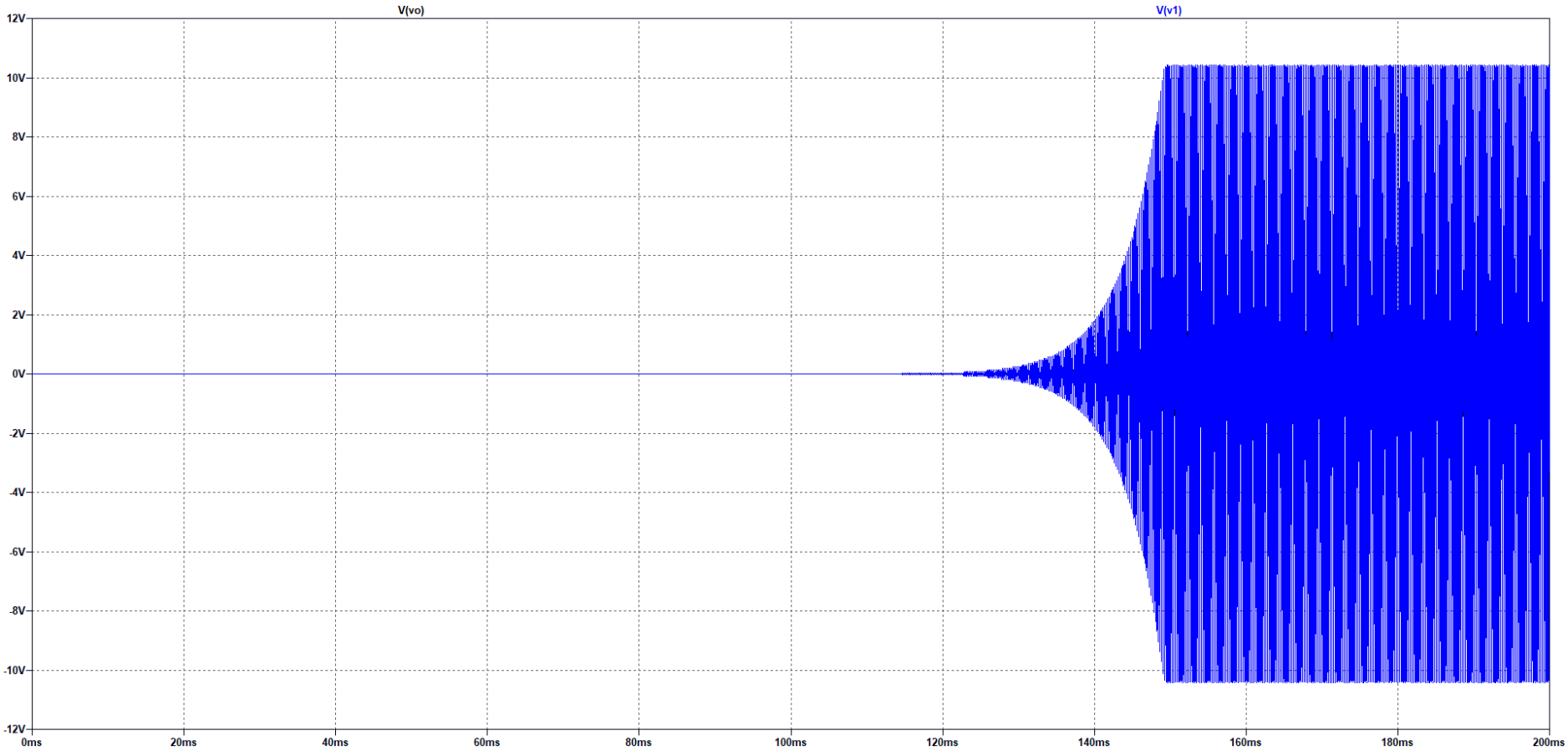


Figura 3 - Ponto mínimo para oscilação sustentável simulado

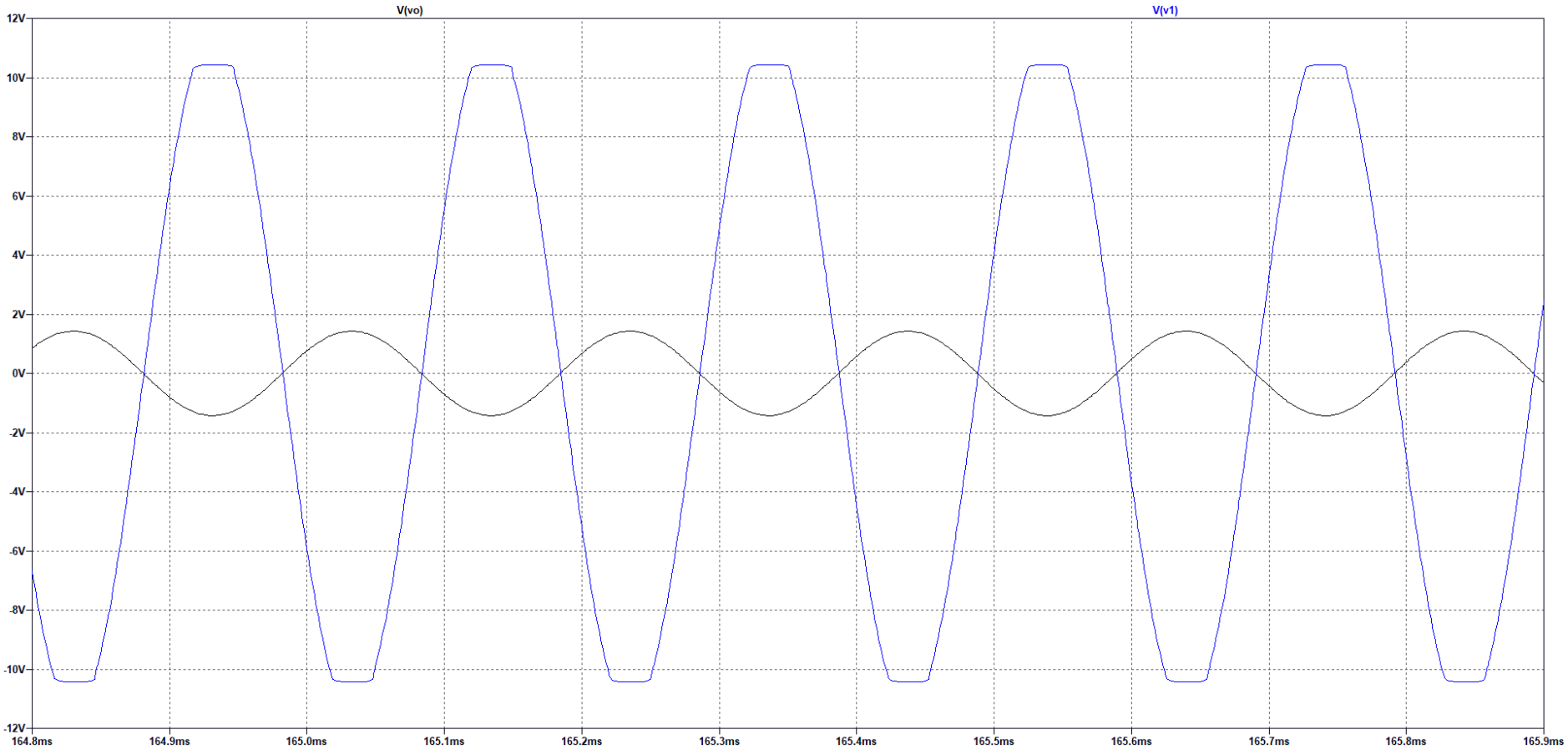


Figura 4 - Ponto mínimo para oscilação sustentável em detalhe simulado

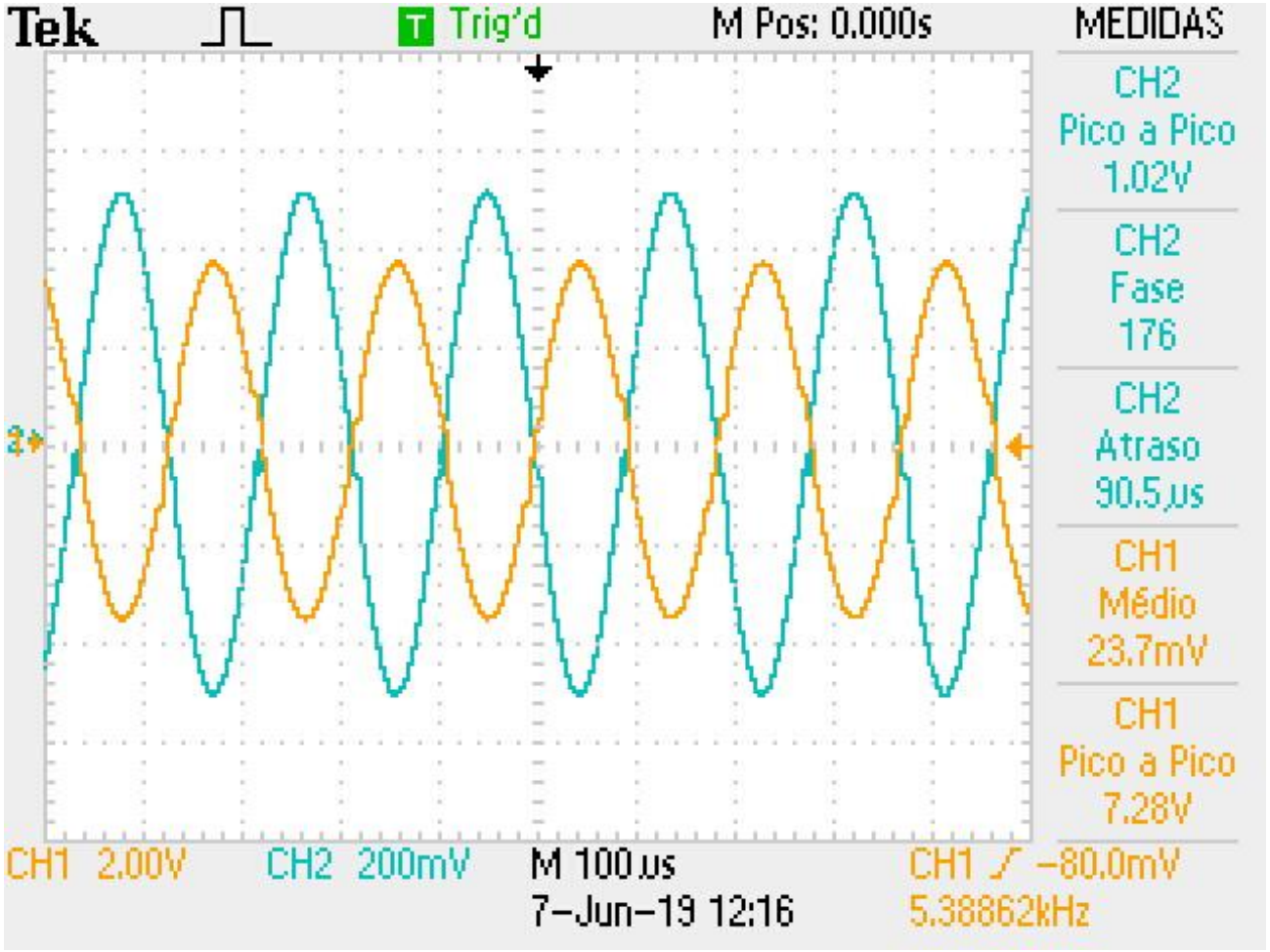


Figura 5 - Oscilação com Circuito Limitador experimental

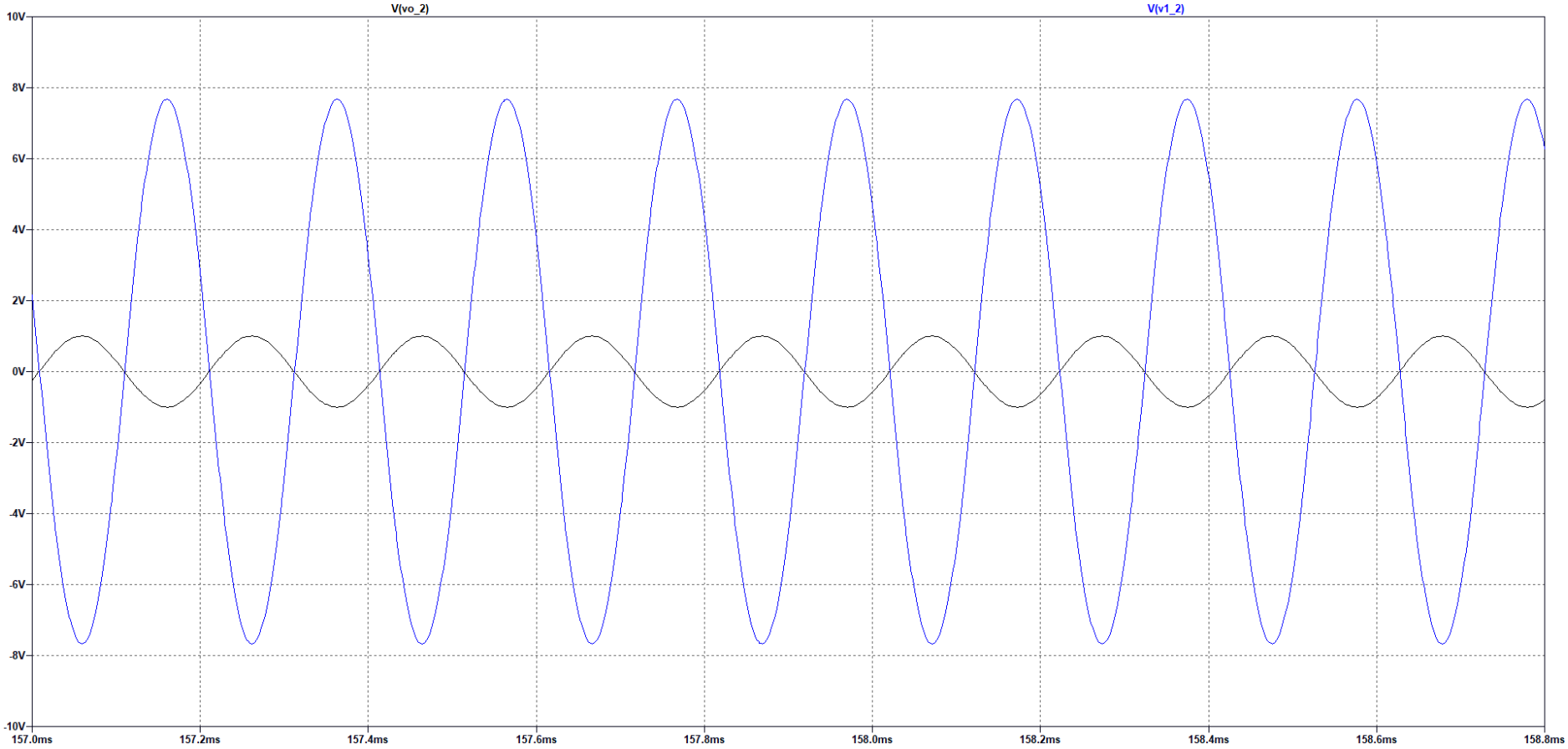


Figura 6 - Oscilação com Circuito Limitador simulado

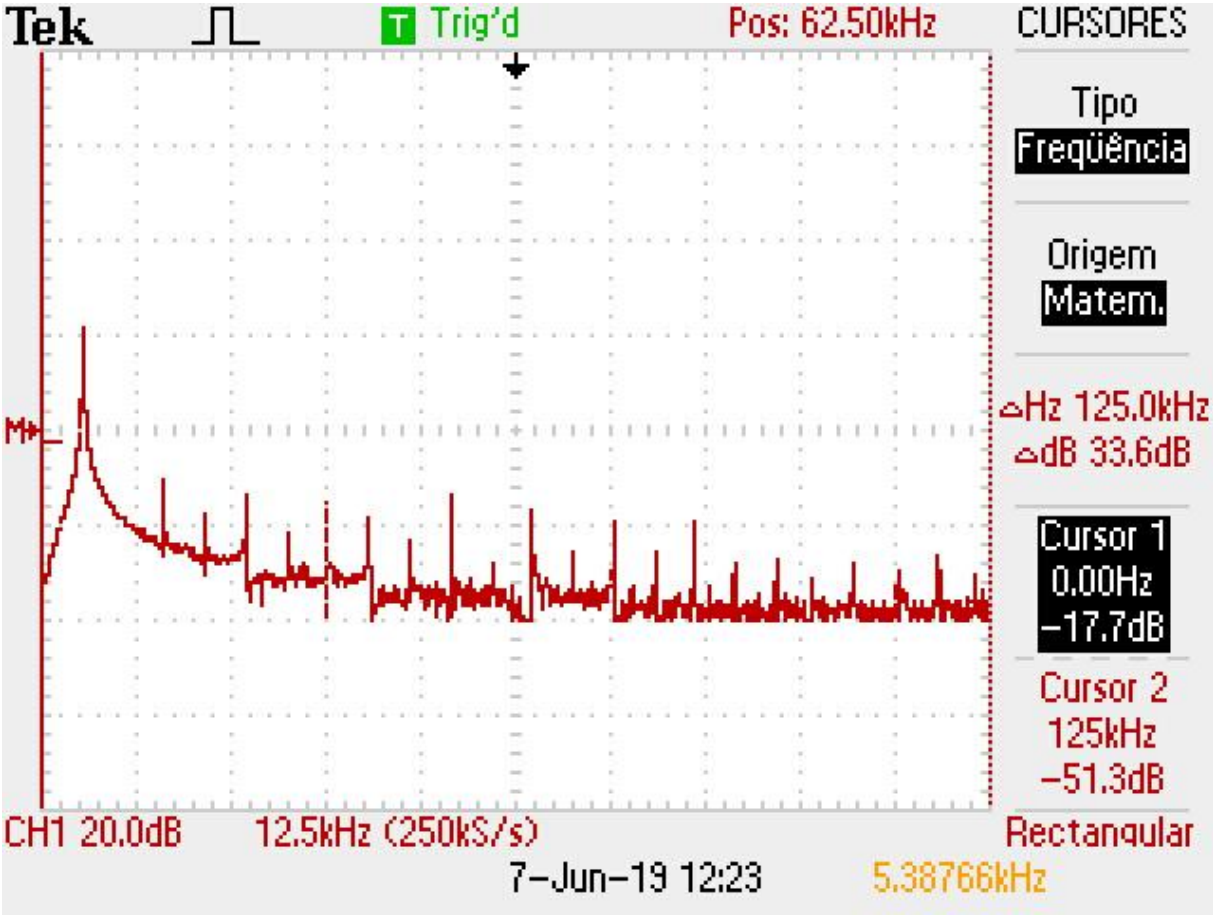


Figura 7 - FFT saída circuito limitador experimental

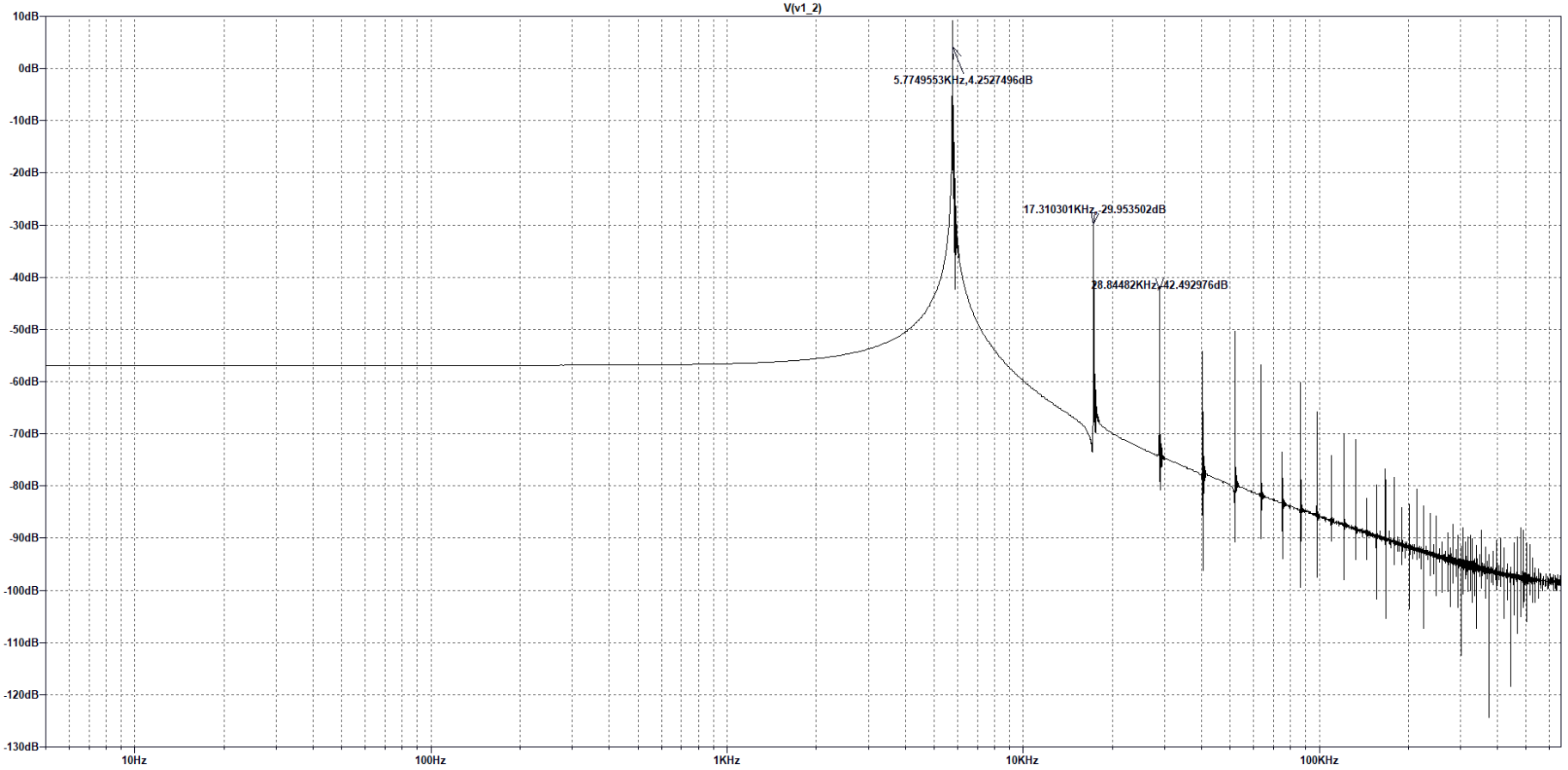


Figura 8 - FFT saída circuito limitador simulado

N-Period=1
Fourier components of V(v1_2)
DC component:0.920945

| Harmonic Number | Frequency [Hz] | Fourier Component | Normalized Component | Phase [degree] | Normalized Phase [deg] |
|---|---|---|---|---|---|
| 1 | 5.000e+03 | 8.463e+00 | 1.000e+00 | 118.93° | 0.00° |
| 2 | 1.000e+04 | 1.385e+00 | 1.637e-01 | -41.65° | -160.58° |
| 3 | 1.500e+04 | 6.809e-01 | 8.046e-02 | -28.07° | -147.01° |
| 4 | 2.000e+04 | 3.462e-01 | 4.091e-02 | -29.71° | -148.64° |
| 5 | 2.500e+04 | 2.808e-01 | 3.318e-02 | -23.14° | -142.07° |
| 6 | 3.000e+04 | 2.327e-01 | 2.750e-02 | -12.78° | -131.72° |
| 7 | 3.500e+04 | 1.947e-01 | 2.300e-02 | -14.27° | -133.20° |
| 8 | 4.000e+04 | 1.652e-01 | 1.952e-02 | -11.51° | -130.44° |
| 9 | 4.500e+04 | 1.504e-01 | 1.777e-02 | -11.52° | -130.45° |

Total Harmonic Distortion: 19.499878%(20.128664%)

Figura 9 - THD simulada

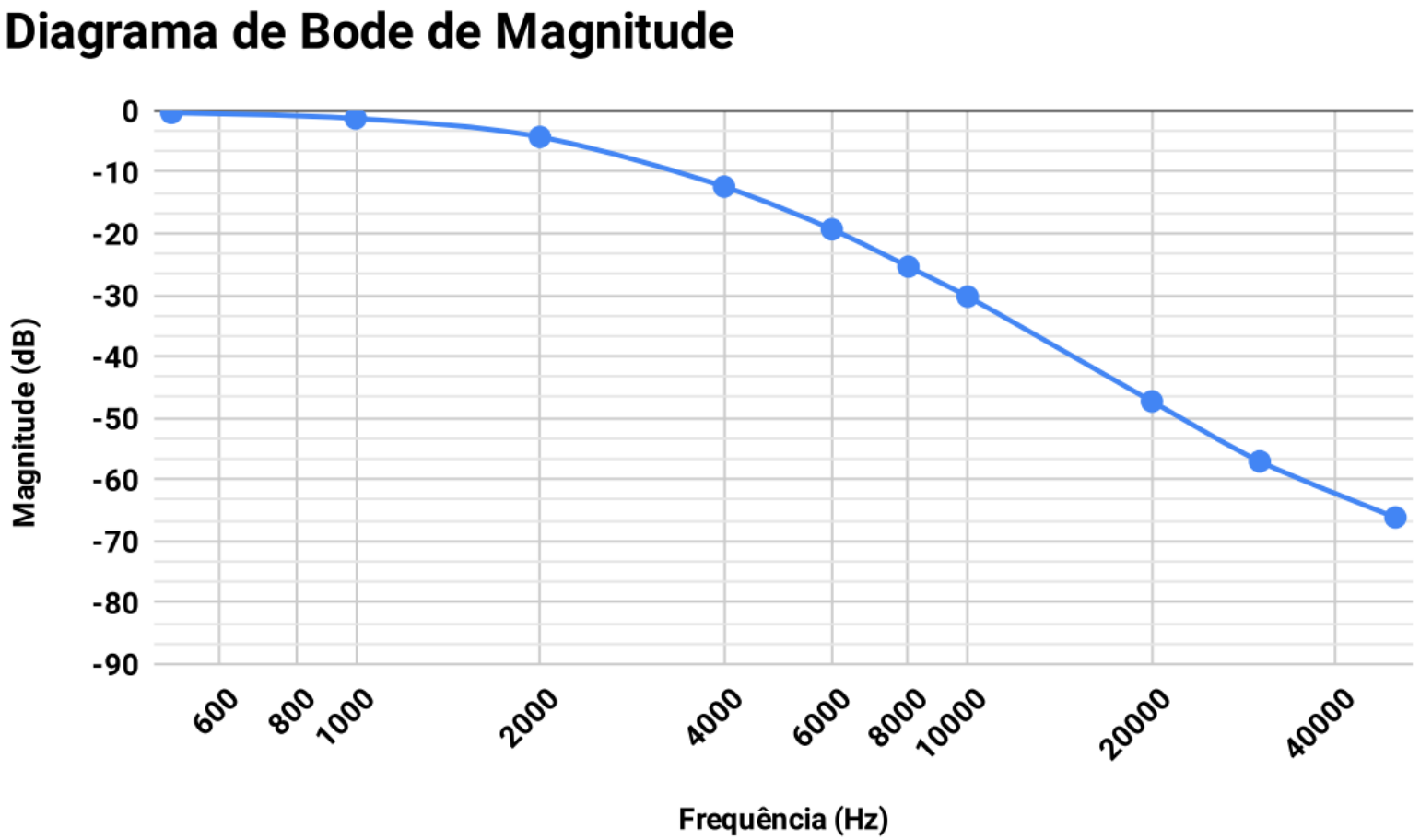


Figura 10 - Diagrama de Bode de Magnitude experimental

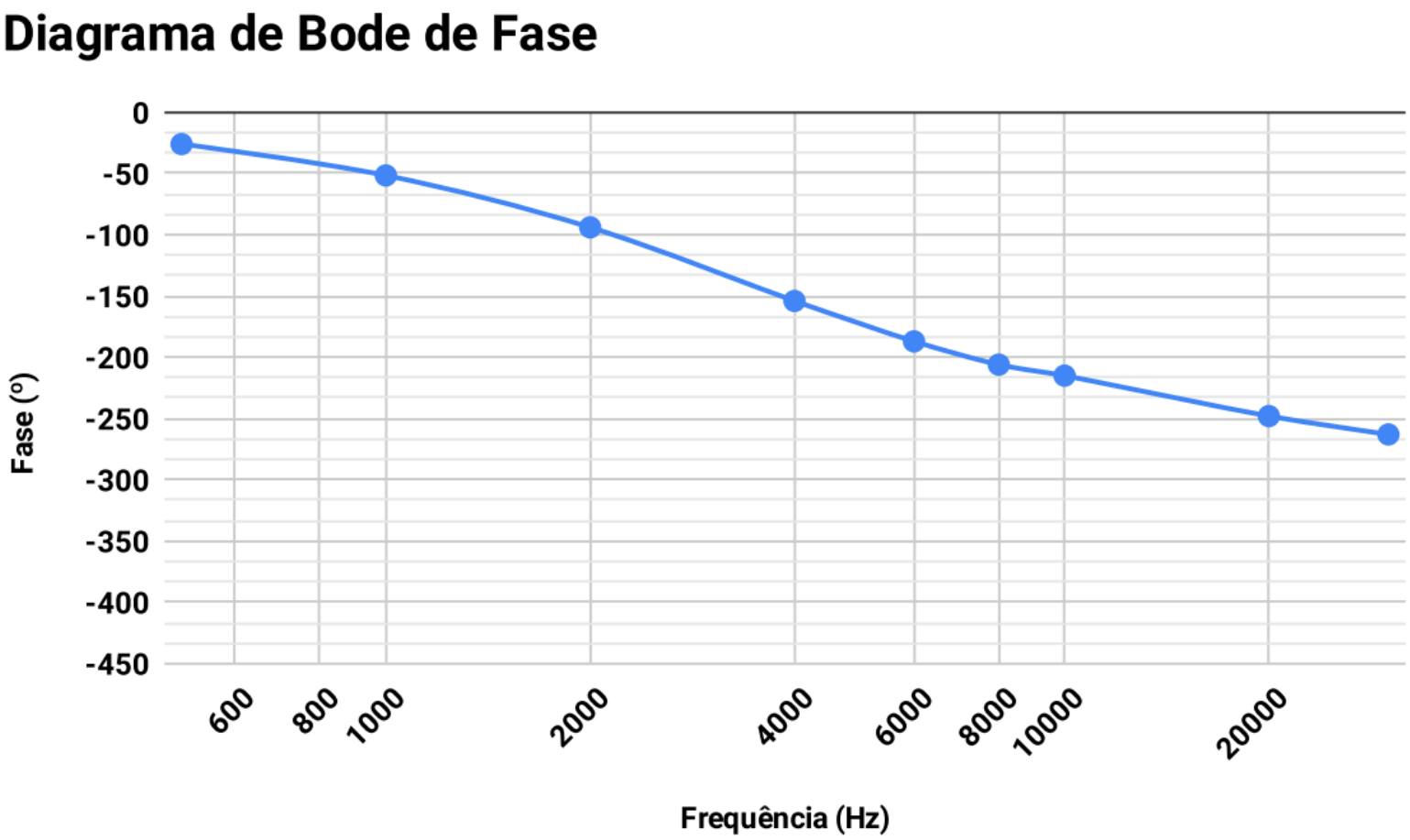


Figura 11 - Diagrama de Bode de Fase experimental