0.1 Envelope Detector Examples

Note: All figures for this section are found in Figures/Envelope_Detector

Below is a simple "Envelope Detector" circuit, Figure "Envelope_Circuit_1". This circuit was simulated in PSpice, resulting in the plots below. These plots import from the tables in the "Data" folder for Circuit 1.

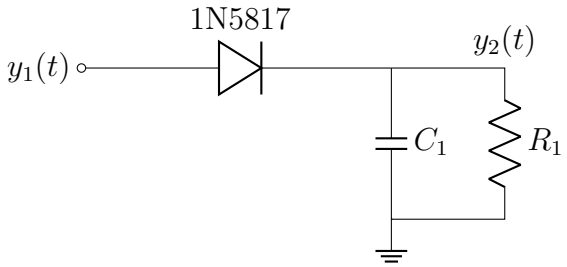

Figure 1: Ideal Envelope Detector Circuit

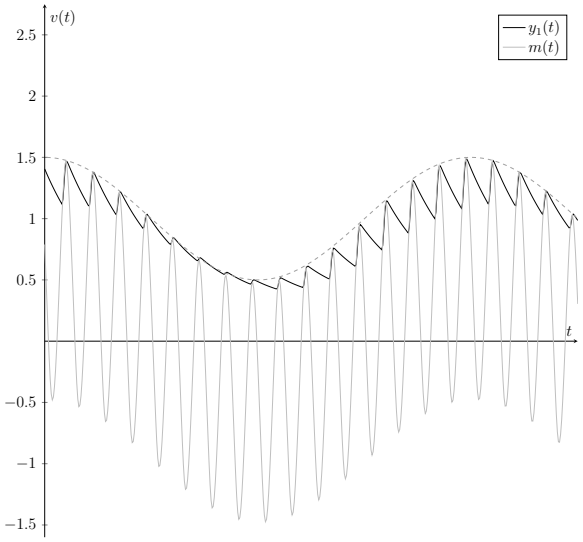

Figure 2: Ideal Circuit: $y_1(t)$ vs $y_2(t)$ with $V_F = 0$V

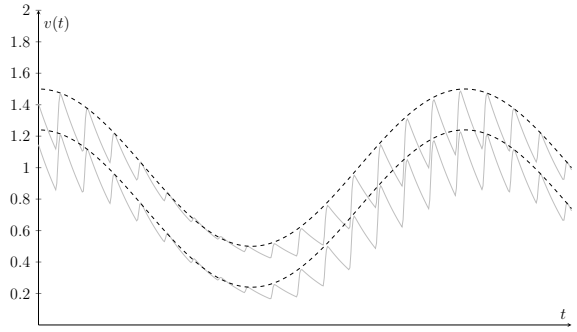

Figure 3: Ideal Circuit: Loss from Diode

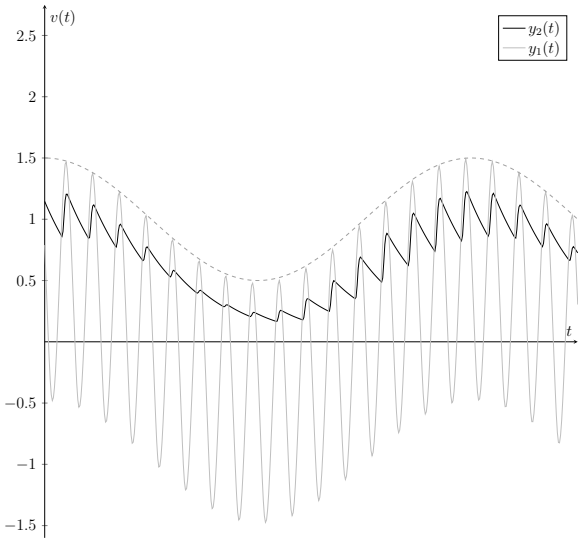

Figure 4: Ideal Circuit: $y_1(t)$ vs $y_2(t)$ with with $V_F = 0.26$V

A more practical circuit is shown below in Figure 5, and the same circuit with a 'UA741 Op-Amp Adder Circuit' added to the left is shown in Figure 6. The adder circuit creates and AM signal with message $m(t)$ and carrier $c(t)$, and the circuit shown in Figure 5 approximately recovers $m(t)$. Circuit 3 was simulated in PSpice, and similarly with Circuit 1, the resulting plots are shown below. These examples pull from the other data file, exported from PSpice.

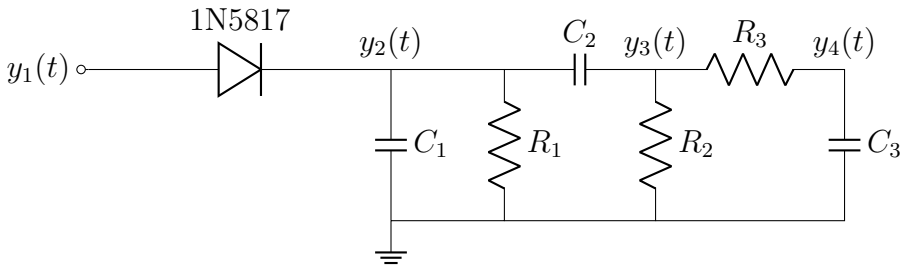

Figure 5: Practical Envelope Detector Circuit

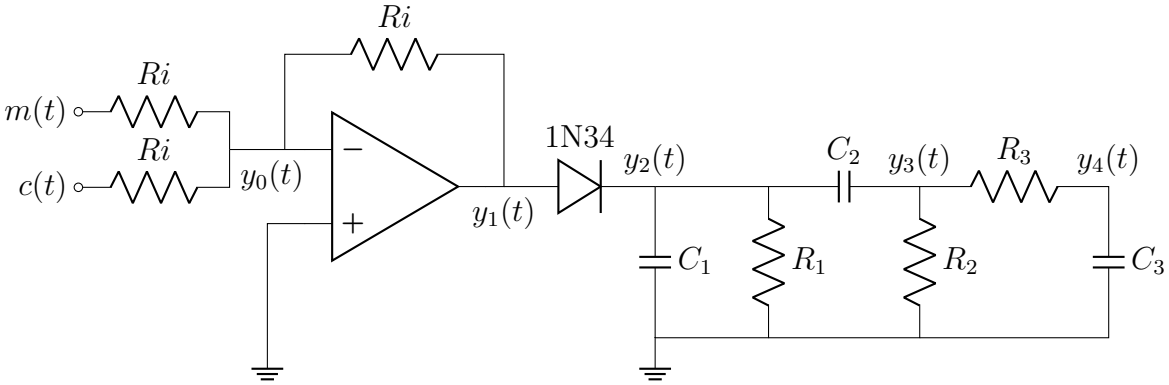

Figure 6: Complete Envelope Detector Circuit

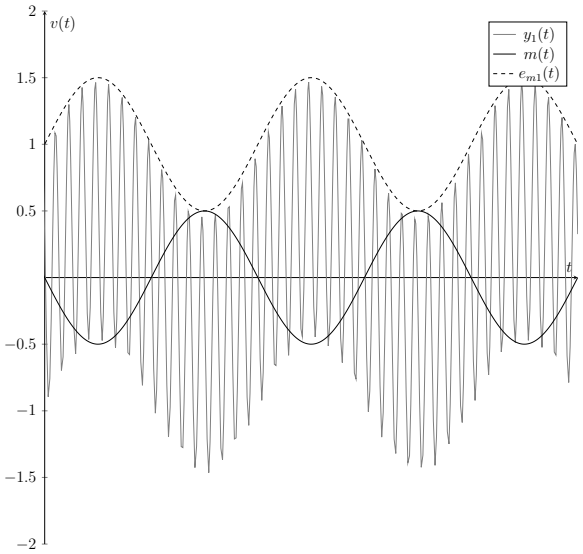

Figure 7: Envelope Detector: $y_0(t)$ vs $y_1(t)$

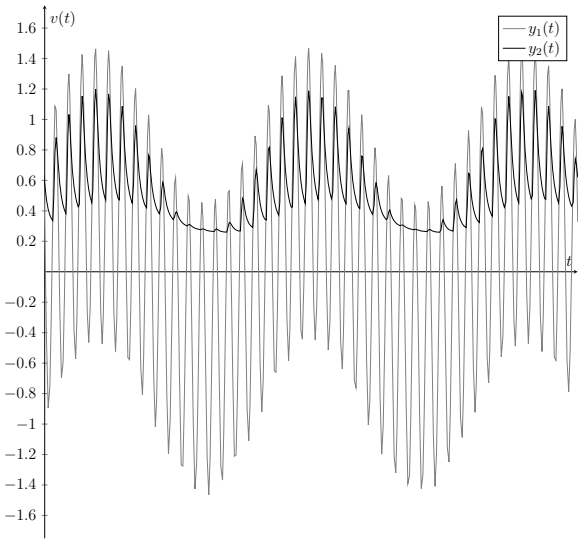

Figure 8: Envelope Detector: $y_1(t)$ vs $y_2(t)$

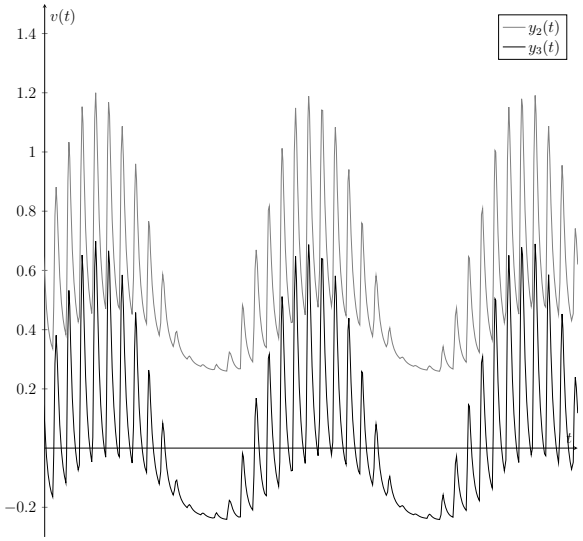

Figure 9: Envelope Detector: $y_2(t)$ vs $y_3(t)$

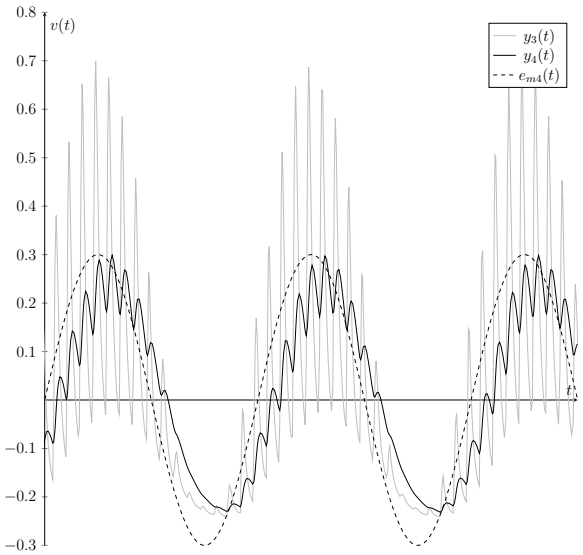

Figure 10: Envelope Detector: $y_3(t)$ vs $y_4(t)$