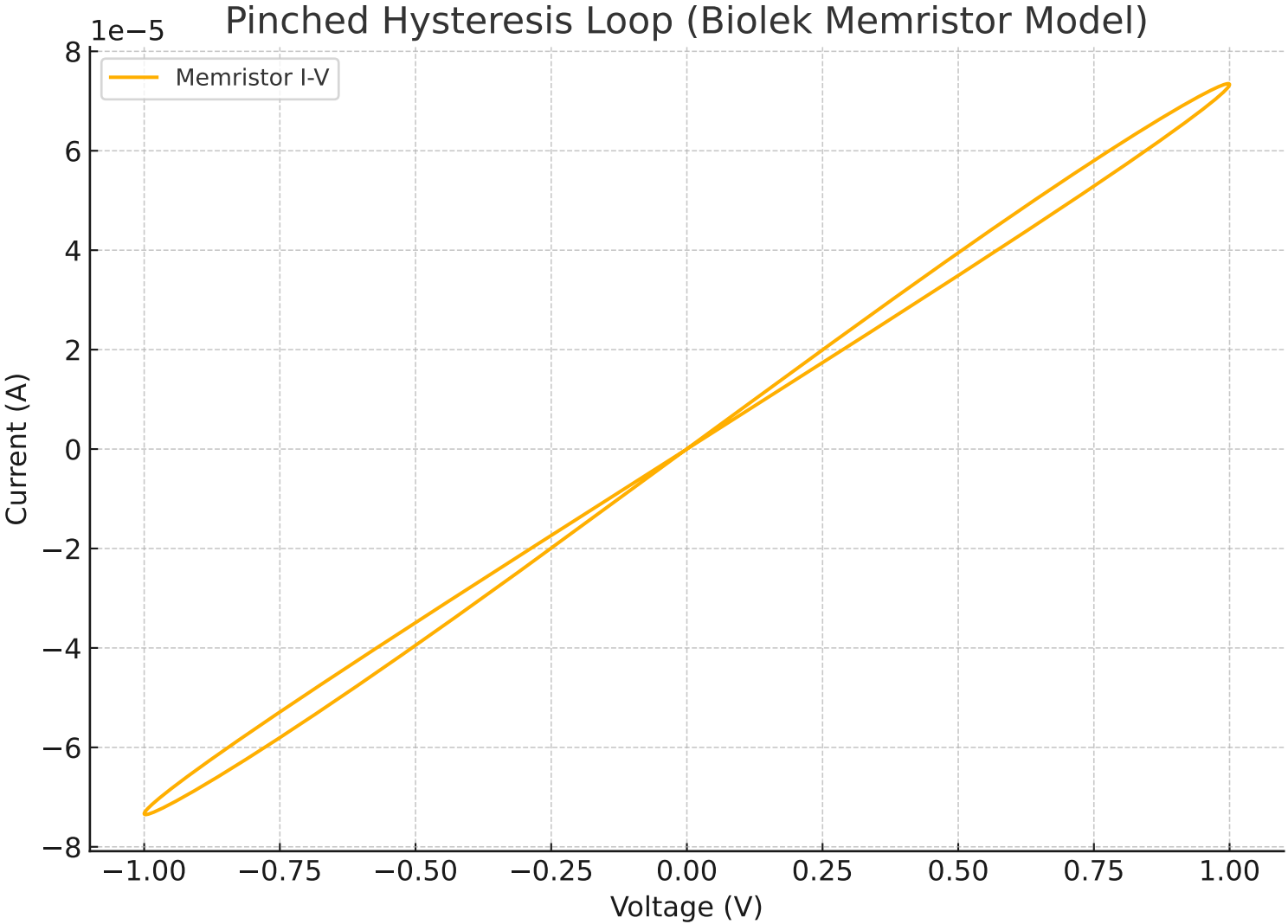
Pinched Hysteresis Loop (Biolek Memristor Model)
1e−5
Memristor I-V
Current (A)
Voltage (V)
8
6
4
2
0
−2
−4
−6
−8
−1.00
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75
1.00

Memristor Simulation Using the Biolek Model (Python)

Overview:
This challenge involves simulating the behavior of a memristor based on the Biolek model.
Memristors are crucial components in neuromorphic computing because they mimic synaptic plasticity.
This simulation models a memristor in Python and simulates its response to a sinusoidal voltage input.

Key Points:
- Simulated the Biolek windowed model.
- Observed the pinched hysteresis loop in the I-V curve, a hallmark of memristors.
- Used a simple Euler method for solving differential equations.
- Parameters chosen are consistent with realistic memristor dimensions.

Tools Used:
- Python 3, NumPy, Matplotlib

Author: Vinod Kumar Bandela
Course: ECE 410/510 - Spring 2025
Instructor: Christof Teuscher
Challenge #28