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A Simple Memristor Model for Circuit Simulations FARRAH-AMOY FULLERTON, AALEYAH JOE, NADINE GERGEL-HACKETT, Mary Baldwin College, DEPARTMENT OF CHEMISTRY AND PHYSICS TEAM —
This work describes the development of a model for the memristor, a novel nanoelectronic technology. The model was designed to replicate the real-world electrical characteristics of previously fabricated memristor devices, but was constructed with basic circuit elements using a free widely available circuit simulator, LT Spice. The modeled memrsistors were then used to construct a circuit that performs material implication. Material implication is a digital logic that can be used to perform all of the same basic functions as traditional CMOS gates, but with fewer nanoelectronic devices. This memristor-based digital logic could enable memristors' use in new paradigms of computer architecture with advantages in size, speed, and power over traditional computing circuits. Additionally, the ability to model the real-world electrical characteristics of memristors in a free circuit simulator using its standard library of elements could enable not only the development of memristor material implication, but also the development of a virtually unlimited array of other memristor-based circuits.

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