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Exceptional Points of Degeneracy (EPD) in Circuit Configurations

Tech ID: 34153 / UC Case 2022-929-0

BRIEF DESCRIPTION

This technology enhances the sensitivity of sensors through exceptional points of degeneracy in various circuit configurations.

FULL DESCRIPTION

The invention focuses on making sensitive oscillators using the instability in circuits with exceptional points of degeneracy (EPD) in distinct circuit configurations, including gyrator-based coupled resonators, PT-symmetry coupled resonators, and single resonators with time-varying components. It highlights the circuits' high sensitivity to minute changes in resistance, capacitance, and inductance, leading to an enhanced sensitivity of the oscillation frequency to perturbations of the reading element of a sensor (capacitor, an inductor, or a resistor). The research explores the conditions for stability and instability within these configurations, turning instabilities into advantages for creating highly sensitive oscillators.

SUGGESTED USES

- » High-sensitivity sensors for chemical, biological, and physical monitoring.
- » Advanced sensing technology for medical diagnostics.
- » Environmental monitoring sensors capable of detecting subtle changes.
- » Industrial process control sensors with enhanced sensitivity.

ADVANTAGES

- » High sensitivity to small perturbations in electrical properties.
- » Ability to convert circuit instabilities into advantages for sensing applications.
- » Innovative use of PT-symmetry and nonlinear gain to create sensitive oscillators.
- » Potential for more efficient high-sensitivity sensors in various applications.

PATENT STATUS

Patent Pending

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OTHER INFORMATION

CATEGORIZED AS

- » **Sensors & Instrumentation**
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