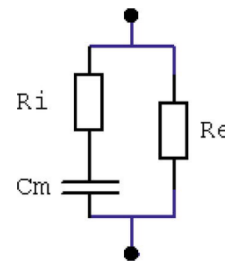
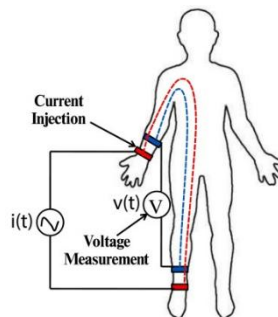


### Portable Bioelectrical Impedance Spectroscopy System for Health Monitoring Using Raspberry Pi Zeros

Project type:  Hardware  Software  Hardware/Software  Simulation  Modeling

#### Project description

Bioelectrical Impedance Spectroscopy (BIS) is a powerful, non-invasive technique for monitoring human health by measuring the electrical impedance of biological tissues across multiple frequencies. This method provides valuable insights into body composition, hydration status, and cellular health by analyzing how tissues respond to electrical signals at different frequencies. This project aims to develop a portable, low-cost BIS system using a Raspberry Pi Zero as the central computing platform. The system will apply small AC signals at varying frequencies to biological tissues and then precisely measure the resulting voltage and current responses to calculate complex impedance values across the frequency spectrum. By leveraging the computational capabilities of the Raspberry Pi Zero alongside precision analog-to-digital converters, this system will provide an affordable yet effective tool for bioimpedance analysis, with potential applications in healthcare monitoring, sports science, and clinical assessment.



#### Tasks:

Task 1: Selection of optimum ADCs to be used with the Raspberry Pi Zero for the project.

Task 2: Make the interface between the ADC and the Raspberry Pi Zero.

Task 3: Use of DMA and FFT for the measurement and Impedance determination.

Task 4: Make the impedance spectrum of the different DUTs and determine the deviation for each one compared to the theoretical.

Task 5: Prepare a report about the work.

**Competences:**

- Python, C/C++
- Raspberry Pi, Embedded system
- Self-learning ability, creative thinking, and motivation to work independently.

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