

# ULTRASONIC MEASUREMENT OF BINOCULAR LONGITUDINAL CORNEAL APEX MOVEMENTS AND THEIR CORRELATION TO CARDIOPULMONARY SYSTEM

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## **Abstract:**

The characteristics of binocular axial eye movements are of interest in studies of eye biomechanics and vision. Current techniques that are used to evaluate such movements were found to be of insufficient resolution. Here, synchronised measurements of binocular eye movements with custom designed high resolution ultrasound transducers, and cardiac electric cycle were considered. The mechanical and electrical signals were examined using spectral, time-frequency, and coherence analyses. The results showed that a close correlation and intricate phase relationships exist between longitudinal eye movements and cardiopulmonary signals. Understanding these relationships could provide a better insight on interactions between eye biomechanics and vision.

**Keywords:** longitudinal corneal apex movements, cardiopulmonary system, ultrasonic distance sensor, spectral analysis, coherence function