Method to Improve the Accuracy of an Independently Acquired Flow Velocity Field Within a Chamber, Such as a Heart Chamber

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BRIEF DESCRIPTION

Currently available techniques used to measure velocimetry within chambers, such as heart chambers, are prone to error due to the inherent limitations of imaging and computational modalities. UC Irvine researchers have developed a novel method that significantly improves the accuracy of velocimetry techniques inside a chamber regardless of the modality.

SUGGESTED USES

·Measuring blood flow pattern in heart chambers via echocardiography

FEATURES/BENEFITS

·Improves accuracy of 3D velocity flow field

FULL DESCRIPTION

Heart diseases have unique blood flow characteristics, and any variation in the blood flow pattern may indicate a change in the overall cardiac performance. Existing echocardiography methods used to quantify blood flow often use two-dimensional (2D) blood flow information to assess cardiac dysfunction. While useful, this information does not provide sufficient accuracy for characterizing complex three-dimensional (3D) flows, such as the flows in hearts with congenital defects or in pulmonary hypertension. However, the quantification of 3D cardiac flow patterns has remained a challenging fluid dynamics problem and modern echocardiography-based velocimetry techniques cannot yet acquire data with sufficient spatial and temporal resolutions to improve clinical diagnosis.

Researchers at University of California, Irvine have invented a novel method that significantly improves the accuracy of velocimetry techniques in measuring 3D flow velocity in chambers, such as heart chambers.

STATE OF DEVELOPMENT

The computer code has been developed and validated.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20240020841	01/18/2024	2022-994

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OTHER INFORMATION

KEYWORDS

Particle image velocimetry, Particle tracking methods, Vector flow mapping, 4D flow MRI, Conservation of mass, Incompressibility, Blood flow, Cardiac flow, Cardiac fluid mechanics, Biofluid mechanics

CATEGORIZED AS

» **Medical**
» Devices
» Disease: Cardiovascular and Circulatory System

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