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Ultrasound in Medicine & Biology

Volume 32, Issue 7, July 2006, Pages 1037-1046

Original contribution

Vector Doppler imaging of a spinning disc ultrasound Doppler phantom

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<https://doi.org/10.1016/j.ultrasmedbio.2006.04.007>

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Abstract

Vector Doppler methods are used to obtain angle independent in-plane velocity information. Velocity magnitude as well as direction are reconstructed from regular steered colour flow and from split-aperture Doppler acquisitions. Spatially resolved in-plane velocity was obtained through Doppler colour flow mode and subsequent data triangulation. A depth-invariant constant Doppler angle was achieved by using a depth expanding transmit-receive Doppler aperture. Velocities of up to 50 cm s^{-1} and 360° vector velocity directions were measured. This was achieved by creating a spinning solid disc phantom. Such a phantom was built to allow underwater mounting and spinning of a solid disc-shaped ultrasound phantom (maximum velocity of 50 cm s^{-1}). Doppler triangulation was realised by steered Doppler and by a split-aperture approach. Results of both imaging methods are shown. Split-aperture results showed errors of less than 10%

for velocity magnitude estimation and less than 2.5λ for directional information. (E-mail: greentom@umich.edu)



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Key Words

Doppler; Triangulation; Vector Doppler; Split-aperture; Phantom; Colour flow

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