

Estimation and Imaging of Blood flow Velocity

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This course provides a basic understanding of the physical principles and signal processing methods for estimation of blood flow velocity. The course begins with an overview of currently used techniques for velocity estimation using pulsed- and continuous-wave Doppler, and color flow imaging. Fundamental challenges related to data acquisition will be presented. Further, statistical models for the received signal as well as commonly used velocity estimators will be developed. The suppression of clutter from slowly moving targets is central to all processing schemes and will be given special attention. Finally, an introduction to advanced topics such as adaptive clutter filtering and 2-D / 3-D vector velocity estimation techniques will be given. Principles and practical limitations will be discussed, and potential clinical applications will be shown.

Hans Torp received the MS degree in mathematics in 1978, and the Dr. Techn. Degree in electrical engineering in 1992; both from the University of Trondheim, Norway. Since 1980 he has been working with ultrasound technology applied to blood flow measurements and imaging at the University of Trondheim, in cooperation with GE-Vingmed Ultrasound. He is currently professor of medical technology at the Norwegian University of Science and Technology, and has since 1987 given courses on ultrasound imaging and blood flow measurements for students in electrical engineering and biophysics. His research interests include statistical signal- and image processing with application in medical ultrasound imaging.

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