Abstract Submitted
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An Evaluation of the Jorqenson Equation JOHN FOSS, ATRA AKANDEH, Michigan State University, DOUGLAS NEAL, LaVision Inc. — Multi-sensor hot-wire probes require some processing algorithm to obtain components of the velocity vector at the measurement location. The Jorgenson equation (1) is used by numerous investigators for this purpose. There exist various algorithms to extract the velocity components from the recorded voltages. The present contribution is not to evaluate such algorithms; rather, it is to evaluate the agreement between the inferred (from (1)) and the known (measured) velocities for a range of pitch (angle α) and yaw (angle β) orientations of the probe body. That is, the objective is to "give counsel" to those investigators who are considering the use of (1). Calibration data from Neal (2010) provide $\vec{V}$ at (α, β) - each 9° to +/- 36°. Since E(α, β) is to represent $\vec{V}$ (α, β), percentage error magnitudes will be presented.

$$E^2 = A + BV_{eff}^n \text{ and } V_{eff}^2 = U_n^2 + K_T U_T^2 + K_B U_B^2 \quad (1)$$

Jorqenson, F. E. (1971) "Directional Sensitivity of Wire and Fiber Film Probes, An Experimental Study," DISA Information No. 11

Neal, D.R. (2010) "The Effects of Rotation on the Flow Field Over a Controlled-Diffusion Airfoil", PhD Michigan State U.

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