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Secondary flow structure detection using boundary tracing under physiological inflow through a bent pipe model for curved arteries[1]
SHADMAN HUSSAIN, KARTIK V. BULUSU, AUTUMN L. GLENN, The George Washington University, FANGJUN SHU, New Mexico State University, MICHAEL W. PLESNIAK, The George Washington University — Experimental data from an investigation of secondary flows in a bent artery model under physiological inflow conditions were obtained using the PIV technique. Continuous wavelet transforms were used to resolve coherent vortical structures in cases with and without an idealized stent model. Boundaries of these structures were traced using MATLAB functions to estimate their circulation and scale. Vortical structures of different scales, possessing approximately equal strength were observed in histograms of phase-locked measurements with the stent model. A circulation threshold was established to facilitate identification of smaller-scale, high-circulation secondary flow vortical structures. A parametric study of circulation thresholding was performed to gain insight into the scales associated with secondary flow structures in curved artery models.

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