



Vortrag

Applications of POD and LSE for PIV: Developing useful analysis tools for planar velocity measurement data

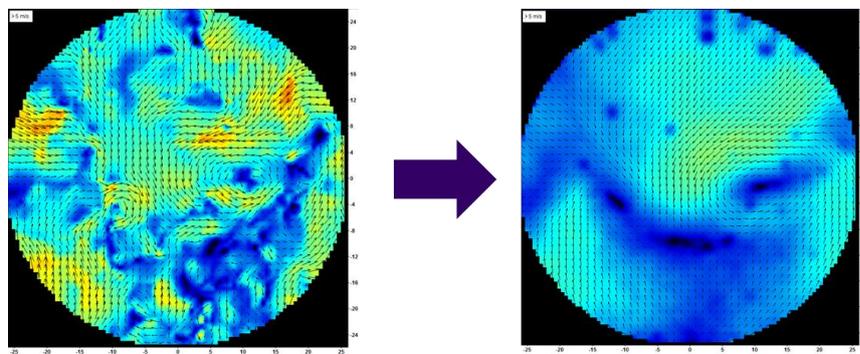
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Particle Image Velocimetry (PIV) provides detailed information of fluid velocity fields on an illuminated plane within the field of interest captured by a digital camera. This measurement technique is now widely used and trusted to provide good spatial and temporal resolution. This presentation will highlight through several examples the application of Proper Orthogonal Decomposition (POD) and Linear Stochastic Estimation (LSE) to help understand and make better use of PIV data in complex confined turbulent flows.

Analysis techniques will be introduced through an example based on a study: using PIV for generating Large Eddy Simulation (LES) boundary conditions for a Gas Turbine combustor. This is specifically for when the inlet planes cannot be synchronously measured using a single PIV field of view. Two examples will then be given to demonstrate how POD may be used to separate coherent fluid motions from stochastic behaviour using different techniques that have increased understanding of Helmholtz resonators and cycle-to-cycle variations in internal combustion engines respectively.

Finally, insight will be given of how to combine the LSE and POD techniques to construct volumetric information from planar PIV realisations downstream of an air-swirl nozzle. By using an LES prediction to extract synthetic PIV data the reconstruction technique can be validated against full volumetric data in the solution domain. This test is also then also repeated with tomographic PIV on the same configuration.



POD filtered PIV data to identify in-cylinder swirl structures

Termin: **19. Januar 2017, 11:10 Uhr**
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