

Development and Application of High Fidelity, Spectral/hp Element for Complex Geometry Industrial Flow Simulation

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Abstract

In this presentation we will outline the development of high order, spectral/hp element discretisation for complex geometry, industrial flow simulation using mixed shaped elements. We will overview key steps involved in translating the spectral/hp element technology from applied mathematical academic concepts to a discretisation method suitable for solving flow problems of industrial interest and to provide underpinning data for AI methodologies. In addition, motivated by the prevalence of GPU based high performance computers, we will outline the most recent efforts to port this technology onto vectorised and streaming architectures suitable for optimal use on CPUs with Advanced Vector Extensions (AVX) and on GPUs.