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Large-eddy simulation of the flow in a lid-driven cubical cavity using dynamic approximate deconvolution models ROLAND BOUFFANAIS, MARC-ANTOINE HABISREUTINGER, MICHEL DEVILLE, Ecole Polytechnique Federale Lausanne — LES of the flow in a lid-driven cubical cavity by the spectral element method using dynamic approximate deconvolution models (ADM) are considered. Explicit filtering is based on an invertible modal filter. Results for $\mathrm{Re} = 12'000$ are showing very good agreement with other experimental and DNS results. An under-resolved DNS has also been carried-out, but on a limited time range just to prove that the under-resolution is effective and the essential need for taking into account the subfilter scales (SFS) and the subgrid scales (SGS). Despite its simple geometry, this 3D unsteady flow at $\mathrm{Re} = 12'000$ is very challenging for SFS and SGS modeling. Indeed, maintaining the energy balance among scales in such a confined fluid domain is a difficult task allowing to track any under- or over-dissipative character of the SFS and SGS dynamic ADM. Furthermore, the transitional nature of this flow makes intense turbulent zones coexisting with laminar regions therefore requiring a proper activation of the SFS and SGS models.

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