## Title:
Stabilized Mixed PGD formulation for fluid flow

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## Short Description:
The proper Generalized Decomposition or PGD is one of the MOR techniques with the particularity to be an "a priori" model order reduction technique. In fact, it requires no prior knowledge of the problem's eigenvectors to generate the results. Instead, an approximation of the eigenvectors is computed on the fly, through solving problems in lower dimensionality spaces. The PGD is currently used in different computational mechanics fields. In fact, it made its proofs in heat transfer, elasticity, even in coupled multidimensional and multi-physical problems as addressed. When it comes to fluid mechanics, the PGD is used with the penalty formulation to solve the Stokes equation in different composite materials manufacturing related applications, the squeeze flow and Ericksen flow for instance. Some other works tackled the Navier-Stokes equation and Rayleigeh Bernard non linear fluid flow, using different approximations to avoid the tricky mixed formulation. In fact, the simulation of incompressible flow is know to be complicated since it requires to deal with subgrid phenomena and the imposing of the conservation of mass equation. The problem becomes even more complicated when dealing with separated representation, specially encountered in the model order reduction techniques. Recent works solved the Ericksen flow with mixed formulation using the PGD, with an attempt to define an LBB condition in the separated representation framework by increasing the degree of the interpolation functions of the velocity with respect to the pressure ones. No stabilized mixed formulation, using the same interpolation functions for both the velocity and the pressure fields, is implemented within the PGD framework until now.