

PANACM 2015

MS 5.17

To be or not to be intrusive?

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In uncertainty quantification computations, one often distinguishes between intrusive and non-intrusive procedures, meaning that in the first case the deterministic software has to be modified, whereas in the latter it does not have to. Stochastic Galerkin procedures are typically seen as intrusive, whereas collocation and other interpolation procedures are seen as non-intrusive. Here it will be shown that both the classical Galerkin procedure as well as the latest extensions to successive low-rank approximations may be also regarded as non-intrusive, and only require access to a possible pre-conditioned residual – this usually corresponds to one iteration of the deterministic solver. Theoretical results as well as numerical examples will be shown.