1154-65-1094 **Alessandro Alla**, **Max Gunzburger*** (mgunzburger@fsu.edu), **Martin Hess**, **Annalisa Quaini** and **Gianluigi Rozza**. *A localized reduced-order modeling approach for PDEs with bifurcating solutions.*

Reduced-order models (ROMs) are low-dimensional discretizations of PDEs that more efficiently treat settings that require multiple solutions such as optimization and UQ. Although ROMs are successful in many cases, ROMs built for the efficient treatment of bifurcating solutions as input parameter values change have not received much attention. In such cases, the parameter domain can be subdivided into subregions that corresponds to a different branch of solutions. ROM approaches such as proper orthogonal decomposition (POD) results in global low-dimensional bases that do not respect the large differences in solutions corresponding to different subregions. In this work, we develop and test a new ROM specifically aimed at bifurcation problems. In the new method, the k-means algorithm is used to cluster snapshots so that within cluster snapshots are similar to each other and are dissimilar to those in other clusters. This is followed by the construction of local POD bases, one for each cluster. The method can detect the cluster a new parameter point belongs to, after which the local basis for that cluster is used to determine a ROM solution. Numerical examples show the effectiveness of the method both for when bifurcations cause continuous and discontinuous changes in the solution. (Received September 13, 2019)