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Physics based interpolation for steady parametric partial differential equations NIRMAL JAYAPRASAD NAIR, MACIEJ BALAJEWICZ, University of Illinois Urbana Champaign — In this work, we present a physics based interpolation method for parametric partial differential equations characterized by moving shocks, discontinuities and sharp gradients. Traditional interpolation and projection-based model order reduction techniques are known to perform poorly for such solutions. In our proposed method, new solutions are provided by a weighted average of spatially shifted snapshots. The snapshots are shifted to minimize the residual of the governing equations. This method is successfully tested on a steady parametric 1D converging-diverging nozzle flow with throat area as the parameter as well as steady 2D supersonic flow over forward facing step with inlet Mach number as the parameter.

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