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Shallow PINNs using Levenberg-Marquardt algorithm for optimization

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In this talk, we will demonstrate the effectiveness of Shallow Neural networks for solving PDEs. It is a well-known fact that Levenberg-Marquardt (LM) method offers the advantage of both the steepest-descent and Hessian based optimization method unless the number of optimization parameters becomes too large; therefore, the method is well suited for optimizing weights for shallow neural-networks. We exploit this property of the LM method to solve singular-perturbation problems. We demonstrate that the method offers an advantage in terms of time and computational resource requirements for the studied problems. Further exploration of the method for solving other kinds of PDEs with more dimensions is ongoing.