

We Still Can't Get Enough of Layers..... but Why?

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ASince Prandtl introduced the boundary layer, “effect of friction are experienced very near an object moving through a fluid”, more than a hundred years has been passed, the study of boundary layer behavior has been still a focus of scientific research in many different disciplines. Inspired by a series works of Gottlieb-Shu in mid-90th on the Gibbs phenomenon, we design a special algorithm to obtain correct solutions from oscillatory solutions for singularly perturbed convection-diffusion equation in one spatial dimension. We also study the overshoot of the cubic spline (and likewise other higher-order splines) approximation to discontinuous data. Finally, some superconvergence issues of numerical approximation for singularly perturbed problems that have boundary layer behaviors will also be discussed.