1116-S1-2840 **Douglas B Meade*** (`meade@math.sc.edu`) and **William E Boyce**. *A New Perspective on Variation of Parameters.*

The traditional motivation for the method of variation of parameters for finding a particular solution for a non-homogeneous second-order linear ODE leaves a lot to be desired. In particular, when looking for a solution in the form $y_p = u_1(x)y_1(x) + u_2(x)y_2(x)$, where $\{y_1, y_2\}$ is a fundamental set of solutions, why should $u_1'y_1 + u_2'y_2$ be zero?

In this talk the authors will present a new perspective on variation of parameters in which this constraint arises naturally. This approach also extends to the method of variation of parameters to higher-order ODEs, and is consistent with the derivation of an integrating factor for first-order problems.

This derivation combines a number of fundamental concepts found in most introductory ODE courses: equivalence between an nth-order linear ODE and a first-order linear system of n ODEs, the linear independence of fundamental sets of solutions, and the non-vanishing of the Wronskian of fundamental sets of solutions.

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