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Joseph Daniel Rudmin* (rudminjd@jmu.edu), JMU ISAT MSC4106, 801 Carrier Dr.,
Harrisonburg, VA 22807. *A Topological Approach to the Parker Sochacki Method for Solving
Differential Equations.*

A general all-order topological approach to the Parker Sochacki Method of solving differential equations applied to a Yang Mills field with a non-trivial interaction generates homotopic solutions at all energy scales. The shift operator extends domains of convergence of resulting Taylor Series. Properties of the first-order polynomial form of differential equations guides one in optimizing initial conditions to find bounded periodic states. While a simple solution to the Yang Mills equations of motion has the form of a tower of states, the simplicity of the Yang Mills equations of motion admits arbitrary scaling of the energy spacing of the tower of states. (Received December 17, 2019)