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**Underlying mathematical structure shared between boundary layers and the pandemic** NATHANIEL BARLOW, STEVEN WEINSTEIN, Rochester Institute of Technology — As of yet, there is no exact analytic solution to the Blasius, Falkner-Skan, and Sakiadis boundary layer problems. However, for each of these, there exists asymptotic expansions that can be used to construct approximate analytical solutions. The same can be said for the nonlinear systems of differential equations that are currently being used to model the pandemic. The authors show how a large parameter expansion of the Sakiadis boundary layer problem (Barlow et al., QJMAM 2017) is of the same form as the long-time expansion of the Susceptible-Infected-Recovered model of epidemiology (Barlow Weinstein, Physica D 2020). The method of asymptotic approximants is used to find closed-form accurate analytic solutions for both of these problems, over the entire domain on which they are defined.

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