Flow resistance computation for a non-wetting fluid in an interior corner[1] DANNY BOLLEDDULA, MARK WEISLOGEL, Portland State University — Capillary flows in containers or conduits with interior corners are commonplace in nature and industry. The wide majority of investigations addressing such flows have solved the problem numerically in terms of a flow resistance coefficient (friction factor) for cases where spontaneous liquid spreading along the corner occurs for contact angles below the Concus-Finn critical wetting condition for the particular conduit geometry of interest. This research effort provides missing numerical data for the flow resistance coefficient for partially wetting systems above the Concus-Finn condition. In such cases the fluid spontaneously de-wets the interior corner and often retracts into corner-bound drops. A narrowly banded numerical coefficient is desirable for further analysis and is achieved by careful selection of length scales to nondimensionalize the problem. Example solutions to steady and transient flow problems are provided that illustrate application of the results.

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