Davis, A. M. J.
Combinations of parallel and sink flows at low Reynolds number: Models for duct-bifurcation. (English) Zbl 0615.76039

(From author’s introduction.) By starting from the observation that separation exhibited in Stokes flow will persist as the Reynolds number is increased from zero, it is of interest to consider canonical creeping flows of bifurcating character and try to exploit the many mathematical techniques available for these linear problems. Attention here is on the two and three dimensional combinations of a parabolic flow and sink which are discussed in sections 2 and 4, respectively, as further models of bifurcating flow patterns. The solution for the sink in the pipe wall is complicated but considerable simplification can be achieved by careful rearrangement of the Bessel functions. Section 3 relates the analysis of section 2 to the canonical problem associated with the three-dimensional eddy exhibited in the flow past a hemispherical bump on a plane.

Reviewer: F.A.Howes

MSC:
76D07 Stokes and related (Oseen, etc.) flows

Keywords:
duct-bifurcation; separation; Stokes flow; canonical creeping flows; parabolic flow; sink; bifurcating flow patterns; Bessel functions; three-dimensional eddy; hemispherical bump on a plane

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References:

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