Loss Prediction of Low Re Flow Through Quasiperiodic Serpentine Channels SID BECKER, University of Canterbury — Low Re internal flow through a complex structure whose geometry is regular (periodically uniform) will experience losses that are periodically regular and may be predicted using simple correlations. In many porous media applications this is represented by Darcy's Law. This study considers the prediction of losses through a channel whose geometry is periodic but with characteristic length scales that vary in the direction of bulk flow. Asymptotic expansions of the variation in the characteristic length are implemented in flow simulations in order to determine a correlation relating local hydraulic permeability to local channel geometry. In this way the local losses may be predicted without requiring the explicit solution of the flow field for every specific channel geometry. Several test cases are presented showing that using these correlations, the local pressure losses may predicted to within 0.5% agreement with the solution to the Navier-Stokes Equations.

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