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Jie Yu* (jie_yu@ncsu.edu), Civil, Construction and Environmental Engr, North Carolina State University, Raleigh, NC 27695. *Fluid ratcheting by oscillating channel walls with sawteeth.*

Inspired by an experiment (Thiria & Zhang, BAPS.2010.DFD.HC.3) that demonstrates the effects of ratcheting fluid using vibrational motions of the sawtooth channel walls, we put forward here a theory describing the rectified flow field, and the net directional pumping rate which is related to the spatial average of the steady flow. In a conformally transformed plane, the Stokes boundary layer flow is analysed, revealing the nonlinear effects driving the rectified flow and its complex spatial structure. Whereas the wall sawtooth shape is a source of asymmetry, the difference in entrance and exit flow conditions due to the geometries at the channel ends is found to be a second source to break the left-right symmetry of the system, and affect the net directional transport of fluid. Various influences on the net pumping rate are analysed. (Received January 06, 2014)