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**A boundary condition for fluid/fluid flow at the solid interface**  
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sachusetts Institute of Technology, USA — When using classical hydrodynamics, the  
imposition of no-slip boundary condition on a solid surface results in a logarithmi-  
cally singular shear force at the fluid/fluid/solid line of contact. Boundary conditions  
that admit some form of slip at the solid interface, such as the linear slip-shear re-  
lation also known as Navier slip boundary condition, have been used to regularize  
this singularity. The widely used Cox's theoretical work is also derived under the as-  
sumption of slip at the solid interface. Here we present a boundary condition, based  
on Cox's analysis, that resolves the contact line singularity in the numerical simula-  
tion of contact line flows using a volume of fluid method. This boundary condition  
provides a universal formula that determines the contact angle as a function of the  
grid size. The model can be thought of as a subgrid-scale model for computations,  
where the resolution is not sufficient to accurately describe the contact line inner  
region frictional drag. We provide numerical examples for a wide range of steady  
flow problems.

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