1129-35-468 **David G. Ebin*** (ebin@math.sunysb.edu), Mathematics Department, Stony Brook University, Stony Brook, NY 11794-3651. *Blowup of Solutions to Euler-like Equations (after T. Tao).*

The equations of motion of perfect fluids are commonly expressed as a system of evolution equations in the velocity field of the fluid. It is a long standing question whether the initial value problem for this system has strong long-time solutions. We cannot answer this question, but following T. Tao, we describe related equations for which some solutions blow up in finite time. Our approach uses the equations for the vorticity of the fluid ω rather than the velocity v. This gives a pair of equations

$$\partial_t \omega + \mathcal{L}_v \omega = 0 \qquad v = \delta \Delta^{-1} \omega$$

where $\mathcal{L}_v$ denotes the Lie derivative with respect to v, δ denotes divergence and Δ denotes the Laplacian. By changing Δ^{-1} to other operators of degree -2, one can find solutions that blow up in finite time. Thus any proof which showed there was no blow up would have to be sufficiently specific so that it would not work for the other operators. (Received March 21, 2017)