1086-76-1910 **Gregory R Baker*** (baker@math.osu.edu), Department of Mathemtics, The Ohio State University, 231 W. 18th Ave, Columbus, OH 43210, and **Chao Xie** and **Jeong-Sook Im**.

Curvature singularities on the surface of water waves.

Boundary integral methods are naturally suited for tracking the motion of free surfaces in incompressible, inviscid flows. Particular examples include the propagation of waves on the surface of deep or shallow water. Not only is the method naturally adaptive when fluid particles are tracked by following their motion, but also spectrally accurate numerical methods ensure high enough accuracy that important mathematical behavior can be discerned. A pleasing viewpoint arises when the curvature of the surface location is considered as a complex-valued function of the complex-valued arclength. Pole singularities are found that move around the complex plane as the wave progresses. Of special interest, is whether these singularities reach the real axis, when the curvature singularity becomes physically real. They do not reach the real axis after waves have broken, but come extremely close as the curvature of the falling tip becomes extremely large. On the other hand, there is numerical evidence that corners can form in finite time. (Received September 24, 2012)