1018-35-15 **Patrick Q Guidotti*** (gpatrick@math.uci.edu), Department of Mathematics, 103 Multipurpose Science and Technology Bldg., Irvine, CA 92697. *A class of Free Boundary Problems and Maximal Regularity for a Class of Singular Parabolic Abstract Cauchy Problems.*

A class of one-phase diffusive Free Boundary Problems is considered which is characterized by the initial onset of the phase. They can be reformulated as a coupled nonlinear system comprised of a singular Initial Boudary Value Problem of an evolution equation for the unkown interface.

Tools for analyzing the well-posedness and regularity of singular Abstract Cauchy Problems

$$\dot{u} - A(t,u)u = f(t,u) \text{ for } t > 0 \tag{1}$$

are therefore developed and used in analysis of the original Free Boundary Problems. The main feature of (1) is that the family of operators $A(t,u)$ is allowed to be singularly behaved as a function of t in the origin. (Received November 30, 2005)