Electronic Journal: Southwest Journal of Pure and Applied Mathematics
Internet: http://rattler.cameron.edu/swjpam.html
ISBN 1083-0464
Issue 2 December 1999, pp. 13 – 29
Submitted: March 28, 1999. Published: December 31, 1999

SOLUTIONS TO STATIONARY PHASE-FIELD EQUATIONS

Werner Horn

Abstract. In this paper we consider time-independent versions of the Phase-Field Equations introduced by O. Penrose and P. Fife. To this end we will investigate a system of semi-linear elliptic equations. We will show existence of solutions and give results on the multiplicity and the stability of solutions. This will be achieved by applying variational methods and bifurcation methods. We will also point out the physical significance of these results.

1991 A.M.S. Subject Classifications Codes: 35J20, 35J60, 82B26.

Key Words: Nonlinear Elliptic Partial Differential Equations, Variational Methods, Phase Transitions..

Department of Mathematics and CSUN Mathematical Physics Institute
California State University Northridge, Northridge , CA 91330
E-mail Address: whorn@huey.csun.edu