NUMERICAL MODELING OF MULTIPHASE FLUID FLOW IN POROUS MEDIA. APPLICATION TO HEURISTIC OPTIMIZATION IN SLOPE STABILITY ANALYSIS

Pablo A. Beneyto[a]**, H. Ariel Di Rado**[a]**, Javier L. Mroginski**[a] **and Armando M. Awruch**[b]

[a]*Laboratorio de Mecánica Computacional, Universidad Nacional del Nordeste LAMEC-IMIT (CONICET), Av. Las Heras 727, 3500 Resistencia, Chaco, Argentina, pbeneyto@ing.unne.edu.ar*

[b] *Centro de Mecánica Aplicada y Computacional (CEMACOM), Universidad Federal do Rio Grande do Sul, Av Osvaldo Aranha 99, 3er Andar, Porto Alegre (RS), Brasil*

Abstract. The main objective of this work is to present the development of the modeling of the soil consolidation process with contaminant transport based on configurations of stress states and its application to obtain the critical surface in cohesive soil slopes using heuristics optimization based on genetic algorithms. This improved mathematical approach, in addition to covering a wide range of isothermal consolidation problems, inherits the ductility of the three-phase model previously developed by the authors and allows a direct reduction to other more restrictive systems. The results of the method and its heuristic optimization based on genetic algorithms are presented together with the comparison with other approximation methods. From the results presented, it is observed that in cohesive clays, the method of genetic algorithms obtained a critical surface that fits a circle with a mean square error of 1.85%.