

# Modelling of Consolidation Settlement Due to a Circularly Symmetric Fluid Sink

呂志宗, 林鳳彩

Civil Engineering

Architecture

cclu@chu.edu.tw

## Abstract

On the basis of a point sink induced half space fundamental solutions, the investigation presents analytical solutions of the long-term consolidation settlement and excess pore fluid pressure of a saturated elastic aquifer subjected to a circularly symmetric fluid sink. The governing equations of the mathematical model are based on the theory of poroelasticity. The aquifer is modeled as a homogeneous isotropic poroelastic half space, and the total stresses of the aquifer obey Newton's second law and Hooke's law. Besides, the mass conservation and Darcy's law are introduced to formulate the governing equations of pore fluid flow. The software Mathematica is used to complete the symbolic calculations, and the closed-form solutions are derived.

Keyword : Fluid Sink, Half Space, Closed-form Solution, Porous Medium.