



# Numerical Modelling for Geoengineering in Tropical Regions

Dayang Zulaika Abang Hasbollah  
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Universiti Malaysia Sarawak  
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## Preface

‘Tropics’ include all areas on the earth where the Sun contacts a point directly overhead at least once during the solar year, and located surrounding the Equator. The tropics comprise 40% of the earth’s surface area and contain 36% of earth’s landmass. Tropical is sometimes used in a general sense for a tropical climate which means warm to hot and moist year-round. Tropical areas tend to experience more rapid weathering because large amounts of consistent rainfall and constantly warm temperatures that influence the rate of weathering. Tropical areas usually experience both, dry and wet season. The wet /rainy /green season is the time of year, ranging from one or more months, when most of the average annual rainfall in a region falls. This rapid change of hot and cold weather more or less influenced the geology characteristics of the area such as the weathering rate, the soil formation. The uniqueness of geological characteristics in tropical regions has intrigued researchers to explore in details as to how this climate condition influenced the in situ geotechnical process and geological characteristics in order to identify the issues and challenges faced by geotechnical engineers when doing construction in the region. In an ever more globalized world, we are compelled to embrace the technological advancement in order to stay competitive. Hence, by using numerical methods to solve geotechnical problems and analysis are seen to be one of the initiatives to excel in this field especially in tropical geoen지니어ing.

Numerical analysis using finite element and finite difference methods has become a mainstream design tool within geotechnical engineering in the last decades. Numerical modelling is a mature yet vibrant research area in geotechnical engineering. Its advancement has been accelerated in recent years by many emerging computational techniques as well as the increasing availability of computational power. A wide spectrum of approaches, on the basis of continuously advancing understanding of soil behaviour, has been developed and applied to solve various problems in geotechnical engineering. The aim of this edited book is to present original research output by fellows and members of Centre of Tropical Geoengineering (GEOTROPIK) that applied numerical modelling in their analysis of geoengineering in tropical regions. The study area are mostly located in Asian region such as Malaysia, Thailand and Sri Lanka. This book is themed around numerical modeling application in rock mechanics and geology engineering, geotechnical engineering, and geoinformation to measure, manage and analyze the geospatial data relating the earth and its application in tropical regions. This theme is in line with the function of GEOTROPIK as research centre and provider of consultancy services. I thankfully acknowledge the authors for their valuable contribution in this book. Last but not least I feel indebted to reviewers, fellow editors and all those who helped directly or indirectly to make this book a successful and notable remembrance.

August 2020  
Dayang Zulaika Abang Hasbollah  
Chief Editor

# Numerical Modelling for Geoengineering in Tropical Regions

This book presents the compilation of original research output by fellows and members of Centre of Tropical Geoengineering (GEOTROPIK) which has applied numerical modelling in their analysis of geoengineering in tropical region. This book is very suitable and beneficial for academicians, researchers, industries and a quick fix for tropical geoengineering enthusiast who has insatiable thirst of knowledge symptoms.

## The Editors



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