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Tsunami Wave Simulation in the Presense of a Barrier

K. Oktafianto [1], A. Z. Arifin [1], E. F. Kurniawati [1], T.Tafrikan [2], T. Herlambang [3*] and F. Yudianto [3]

[1] *Department of Mathematics, University of PGRI Ronggolawe, Indonesia.*
[2] *Department of Mathematics, Universitas Islam Negeri Walisongo, Indonesia.*
[3] *Department of Information System, Universitas Nahdlatul Ulama Surabaya, Indonesia.*

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Abstract: A tsunami is a series of waves that are generally caused by a vertical change in the seabed due to an earthquake beneath or on the seabed. Tsunamis usually strike coastal areas and result in damage to the shoreline, it can destroy buildings and roads and even take the lives of those who are in the area. One way to reduce the impact of a tsunami is to know the dangers of a tsunami, including natural signs. So, in this paper, it is shown by numerical simulation using the finite difference method, namely, by adding a barrier to the shallow water wave equation. The simulation results obtained in the presence of a barrier, show that the Tsunami waves are split due to hitting the barrier and experience a reduction in wave strength.

Keywords: *tsunami; shallow water equation; finite difference method.*

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1 Introduction

Indonesia as a country that is located between three world plates, namely, the Eurasian, Indoaustralian and Pacific plates, has a high potential for natural disasters [1, 2]. These plates have a high seismic activity, which causes the emergence of many natural disasters [3,4], one of which is the occurrence of earthquakes as a primary impact of seismic activity and tsunamis as a secondary impact [2].

Tsunamis are one of the most dangerous natural disasters and damage the area around the coast [5]. Tsunamis arise as a result of displacement of large volumes of water due to earthquakes, volcanic eruptions, landslides or other phenomena that occur above or below the seabed [6]. The sea waves are not dangerous if their height does not exceed

* Corresponding author: mailto:teguh@unusa.ac.id

