UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

SOLVING A BRAIN TUMOR GROWTH EQUATION
BY
APPLYING ADOMIAN DECOMPOSITION METHOD

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ABSTRACT

In this project, the mathematical model of brain tumor growth introduced by a nonlinear partial differential equation. Since Adomian Decomposition Method (ADM) is a powerful technique to solve nonlinear partial differential equation, therefore, this project applies (ADM) into account the effects of combined use of radiotherapy and chemotherapy treatment. By computing the Adomian polynomials and substituting them into the mathematical model, this project finally get a solution of radius of the treated tumor. The solution obtained will be shown analytically by table a graph in the results and discussion section.

1 INTRODUCTION

A brain tumor is an abnormal growth that starts in the brain and usually does not spread to other parts of the body. There are over 120 different types of brain tumors. For example, the glioblastoma multiforme (GBM). GBM is a brain tumor stage IV that is very dangerous because it is the most aggressive tumor in human and rapidly reproducing abnormal cells.

The death rate is increasing due to brain tumor. Although brain tumors can occur at any age, they are mostly common in children at the age of 3 to 12 years old and in adults 40 to 70 years old. For children, they can not do outdoor activities such as sports because this disease can attack suddenly and they may fall ill. It gives hardship for parents with children who suffer brain tumor. As for the adults, who suffer brain tumor, they can not do heavy work such as building a house and do gardening.

Medical scientist neither knows what causes brain tumors nor how to prevent tumors that start in the brain. People who are at risk for brain tumors include those who have cancer elsewhere in the body, prolonged exposure to pesticides, industrial solvents, and other chemical and inherited disease.

Tumors can affect the brain by destroying normal tissues, compressing normal tissues or increasing intra cranial pressure. Symptoms vary depending on the tumor's type, size and location in the brain. General symptoms include headaches that tend to worsen in the morning seizures, stumbling, dizziness, difficulty walking, abnormal eye movements, weakness on one side of the body, nausea and vomiting.

The American Brain Tumor Association estimates that about 78, 000 people will be diagnosed with a brain tumor in the United States. Unfortunately, each year about 17,000 people die of GBM in the US.

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