

ODE and Diffusion Models of Tumor Growth

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1 Introduction

Researchers have been studying cancer and the patterns behind tumor growth for thousands of years. Hippocrates was accredited with possibly being the first to describe a tumor, and tumors were mainly described by their color and their response to touch. However, ancient physicians did not separate benign and malignant tumors, but they acknowledged the tumor's ability to infect nearby tissue. The application of mathematical models to tumor growth did not start to gain traction until much later, however. In the early 20th century, one of the most famous uses of the diffusion model was first developed: Hill released a paper discussing how the movement of lactic acid and oxygen throughout the body could be shaped into a diffusion problem (Hill, 1928). This paper eventually led to Burton's paper which modeled the growth of tumors using diffusion, applying many of the mathematical tools employed by Hill some years before (Burton, 1966). This paper will present a brief overview of the mathematics used in these papers and will recreate some of the graphics produced as well.

2 Sample Math Equation

Let's try displaying a math equation using LaTeX:

$$e^{i\pi} + 1 = 0$$

This is Euler's famous equation, relating the mathematical constants e , i , π , and 0.

3 Lists

LaTeX also makes it easy to create lists:

3.1 Ordered List

1. First item

2. Second item

3. Third item

3.2 Unordered List

- Apples
- Oranges
- Bananas