# Drug Diffusion in Biological Tissues: Mathematical Analysis and Numerical Simulation

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# Contents

1	1 Introduction		2
<b>2</b>	2 Literature Review and Con	Literature Review and Context	
	2.1 Origin of the Diffusion Ed	quation	2
	_		$\overline{2}$
		es	2
3	Theoretical Exploration		2
	3.1 Equation Classification .		2
			2
		ation	2
		f the Solution	2
4 Numerical Implementation		1	2
		hod	2
		rical Scheme	2
	<del>-</del>	e Analysis	2
			2
5	5 Results and Visualizations	Results and Visualizations	
	5.1 Isotropic vs Anisotropic I	Diffusion Comparison	2
		d Maps	
		cal Solution	2
6	6 Conclusion	Conclusion	
	6.1 Summary of Results		2
	6.2 Limitations and Future I		2

## 1 Introduction

Présentation du problème étudié, motivation biomédicale, objectifs du rapport.

# 2 Literature Review and Context

- 2.1 Origin of the Diffusion Equation
- 2.2 Biomedical Applications
- 2.3 Key Works and References
- 3 Theoretical Exploration
- 3.1 Equation Classification
- 3.2 Mathematical Structure
- 3.3 Simplified Analytical Solution
- 3.4 Physical Interpretation of the Solution

# 4 Numerical Implementation

- 4.1 Choice of Numerical Method
- 4.2 Description of the Numerical Scheme
- 4.3 Stability and Convergence Analysis
- 4.4 Test Case Simulation

#### 5 Results and Visualizations

- 5.1 Isotropic vs Anisotropic Diffusion Comparison
- 5.2 Concentration Curves and Maps
- 5.3 Validation Using Analytical Solution
- 6 Conclusion
- 6.1 Summary of Results
- 6.2 Limitations and Future Improvements

#### References

## References

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- [2] J. Keener and J. Sneyd, Mathematical Physiology, Springer, 1998.
- [3] T. L. Jackson et al., "Mathematical models of drug transport in tumors," *Journal of Controlled Release*, 2009.