THIN FILM OVER THIN POROUS LAYER INFLUENCED BY LENS PERMEABILITY

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Thesis submitted in fulfilment
of the requirement for the degree of
Bachelor of Science (Hons.)
Mathematical Modelling and Analytics

College of Computing, Informatics and Mathematics
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July 2024

ABSTRACT

A thin film is a continuous layer of material that is applied to or interacts with porous substrates. Porous layers act as porous membranes to allow certain substances to pass through affecting the behaviour of thin films on top of them. A thin film is applied over thin porous layers to examine the effects of lens permeability. The thesis examines one aspect of thin film flow which is the tear film with and without contact lenses. This derivation is based on standard lubrication theory modified to take into account the presence of a thin porous layer beneath the tear film. Study the derivation evolution equations for Le-Bars Worster slip models at fluid-porous interfaces. This study attempts to understand the transformation of Partial Differential Equations (PDEs) to perform evolution equation of boundary condition for Le-Bars Worster. Variation of Darcy number and slip length on tear film is used in this case. Additionally, the purpose of this study is to solve the transformed PDEs equations using the Finite Difference method with ode45. The results of this study reveal the effects of various parameters on Darcy's number, lens permeability, slip length, capillary number, gravity parameter, porosity, contact angle and times. The results show the comparison with and without porous layers with various parameters to observe the difference in the results. Furthermore, this study can contribute to understanding relevant physical phenomena and offer potential applications in engineering and science.

ACKNOWLEDGEMENT

Alhamdulillah, I am deeply grateful to Allah SWT, the Almighty, for the blessings and unwavering strength that guided me throughout my academic journey and helped me complete this research. Despite only being able to mention a few people by name here, I would not have been able to complete this thesis without help and support from the kindest people around me. It has been an honor to be supported by my family, especially by my parents, brothers and sisters. This thesis would not have been possible without the support and assistance of my supervisor, Dr Nurul Ainina Binti Redwan. The opportunity to study fluid mechanics and the introduction to thin film flow I received from her are greatly appreciated. In addition, I would like to express my sincere gratitude and appreciation for providing me with invaluable advice, supervision, encouragement and knowledge throughout the completion of this thesis. There are no words to adequately express my gratitude for her outstanding work and patience while assisting me. Aside from their direct assistance with this thesis, I am grateful for all of the opportunities my supervisors provided me with, allowing me to contribute to conferences and to fully benefit from academic life. I greatly appreciate her efforts, kindness and tangible assistance. It is impossible for me to convey my gratitude to all those who played a role in this journey in enough words.

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