Project 5
For the course FYS3150

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December 12, 2019
Week XX - 51

Abstract

An abstract where you give the main summary of your work
The abstract gives the reader a quick overview of what has been done and the most important results. Here is a typical example taken from a scientific article
We study the collective motion of a suspension of rodlike microswimmers in a two-dimensional film of viscoelastic fluids. We find that the fluid elasticity has a small effect on a suspension of pullers, while it significantly affects the pushers. The attraction and orientational ordering of the pushers are enhanced in viscoelastic fluids. The induced polymer stresses break down the large-scale flow structures and suppress velocity fluctuations. In addition, the energy spectra and induced mixing in the suspension of pushers are greatly modified by fluid elasticity.

Contents

1 Introduction

An introduction where you explain the aims and rationale for the physics case and what you have done. At the end of the introduction you should give a brief summary of the structure of the report
What should I focus on? Introduction. You don't need to answer all questions in a chronological order. When you write the introduction you could focus on the following aspects
Motivate the reader, the first part of the introduction gives always a motivation and tries to give the overarching ideas What I have done The structure of the report, how it is organized etc

2 Theory

3 Method

Theoretical models and technicalities. This is the methods section
What should I focus on? Methods sections. Describe the methods and algorithms You need to explain how you implemented the methods and also say something about the structure of your algorithm and present some parts of your code You should plug in some calculations to demonstrate your code, such as selected runs used to validate and verify your results. The latter is extremely important!! A reader needs to understand that your code reproduces selected benchmarks and reproduces previous results, either numerical and/or well-known closed form expressions.

4 Results

Results
What should I focus on? Results. Present your results An eventual reader should be able to reproduce your calculations if she/he wants to do so. All input variables should be properly explained. Make sure that figures and tables should contain enough information in their captions, axis labels etc so that an eventual reader can gain a first impression of your work by studying figures and tables only.

5 Discussion

and discussion
Give a critical discussion of your work and place it in the correct context. Relate your work to other calculations/studies

6 Conclusion and perspective

Conclusions and perspectives
What should I focus on? Conclusions. State your main findings and interpretations Try as far as possible to present perspectives for future work Try to discuss the pros and cons of the methods and possible improvements

7 References

[1] Morten H. Jensen (2019), Project 5, Departement of Physics, University of Oslo, Norway

[2] Erik B. Grammeltvedt, Alexandra Jahr Kolstad, Erlend T. North (2019), GitHub, Students of Departement of Physics, University of Oslo, Norway

[3] Morten H. Jensen (2015), Lecture slides for FYS3150, Department of Physics, University of Oslo, Norway

A Appendix

Appendix with extra material
What should I focus on? additional material. Additional calculations used to validate the codes Selected calculations, these can be listed with few comments Listing of the code if you feel this is necessary You can consider moving parts of the material from the methods section to the appendix. You can also place additional material on your webpage.

A.1 Mass-conversion

$$2\cosh(x) = e^{x} + e^{-x}$$
$$2\sinh(x) = e^{x} - e^{-x}$$

Celestial Body	Mass in kg	Mass in $M_\odot$	Distance to sun in AU
Sun	$M_{\text{Sun}} = M_\odot = 2 \cdot 10^{30}$ kg	1 $M_\odot$	0 AU
Mercury	$M_{\text{Mercury}} = 3.3 \cdot 10^{23}$ kg	6060606.06 $M_\odot$	0.39 AU
Venus	$M_{\text{Venus}} = 4.9 \cdot 10^{24}$ kg	408163.27 $M_\odot$	0.72 AU
Earth	$M_{\text{Earth}} = 6 \cdot 10^{24}$ kg	333333.33 $M_\odot$	1 AU
Mars	$M_{\text{Mars}} = 6.6 \cdot 10^{23}$ kg	3030303.03 $M_\odot$	1.52 AU
Jupiter	$M_{\text{Jupiter}} = 1.9 \cdot 10^{27}$ kg	1052.63 $M_\odot$	5.20 AU
Saturn	$M_{\text{Saturn}} = 5.5 \cdot 10^{26}$ kg	3636.36 $M_\odot$	9.54 AU
Uranus	$M_{\text{Uranus}} = 8.8 \cdot 10^{25}$ kg	22727.27 $M_\odot$	19.19 AU
Neptune	$M_{\text{Neptune}} = 1.03 \cdot 10^{26}$ kg	19417.48 $M_\odot$	30.06 AU
Pluto	$M_{\text{Pluto}} = 1.31 \cdot 10^{22}$ kg	152671755.7 $M_\odot$	39.53 AU

Table 1: Astronomical data