Influence of microstructure on debonding at the fiber/matrix interface in fiber-reinforced polymers under tensile loading

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Abstract

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Acknowledgments

I bought my first and current car, *La Melanza*, in August 2015, just a few weeks before starting my doctoral studies at Luleå University of Technology and Université de Lorraine. Today, October 2019, the odometer reads kilometers. It has been indeed a long journey, one that has brought me to live in two different countries, France and Sweden, and to visit five more, Germany, Greece, Russia, Italy and Spain, for conferences, summer schools and exchanges. A journey in which I have learned a lot, made new friends and built a family. And, apparently, even managed to write a Ph.D. thesis! No such journey could be ventured alone, and here I would like to thank everyone who helped and supported me in these years.

It is common use to place supervisors at the top of the acknowledgements list, and I will not be any different. However, it is with sincere gratitude that I place them here in the first place. Thus, many thanks to Prof. Janis Varna for accepting me as his Ph.D. student, sharing his knowledge, correcting my mistakes, pointing my efforts in the right direction and always being passionate about research.

Luleå, October 2019
Luca Di Stasio

Part I

Chapter 1

A journey of scales

> . . . a "sage", as an anonymous writer has pointed out, "calls up in the average mind the picture of something grey and pedantic if not green and aromatic".
>
> Arthur D. Little

1.1 Vision 2030: challenges of the next decade and beyond for the transportation industry

Passion and curiosity should always lie at the heart of the scientific activity, and that ought to be enough to define the value of a research effort. Time is the real arbiter of the significance of a piece of research, as many examples in the history of science show [**?**][1].However, in these years of increasing mistrust towards scientific research and growing doubts on the value of universities and research institutes, it is worth to reflect on the place of one's own work.

[1]The Ising-Lenz model is one such example [**?**]. It was suggested by physicist Wilhelm Lenz to his doctoral student Ernst Ising to study phase transitions in ferromagnetic materials. Ising solved it analytically in 1D as part of his Ph.D. defense in 1925, but the solution for a 1D lattice did not show any phase transition and was thus regarded as a failure. Almost 20 years later, Onsager solved the 2D version of the model and showed the possibility of phase transitions in the Ising-Lenz model. The Ising-Lenz is now widly reknown in the statistical physics community and has been applied in several different fields.

Chapter 2

Modeling damage in FRPC

2.1 The World Wide Failure Exercises

This is the text of the second chapter. []

2A This is an appendix section

Text of the appendix

2A.1 Subsection 1

Yet some text, and an equation

$$\text{abs}\left(e^{j\pi}\right) = ? \tag{2A.1}$$

2A.2 Subsection 2

And then some...

2B This is another appendix section

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Chapter 3

The fiber-matrix interface crack problem

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Part II

Paper A

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John Doe and Jane Doe

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John Doe and Jane Doe

Abstract

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1 Introduction

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A First appendix of paper A

Some appendix text.

A.1 A subsection of the appendix

$$X(\omega) = \int_{-\infty}^{\infty} x(t) e^{-j\omega t}\, dt. \tag{A.1}$$

A.2 Another subsection of the appendix

Test subsubsection

B Another appendix

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Paper B

The Theory of Research

Authors:
John Doe and Jane Doe

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The Theory of Research

John Doe and Jane Doe

Abstract

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1 Introduction

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A First appendix of paper B

Some appendix text.

A.1 A subsection of the appendix

$$X(\omega) = \int_{-\infty}^{\infty} x(t) e^{-j\omega t}\, dt. \tag{A.1}$$

A.2 Another subsection of the appendix

B Another appendix

Some text in the second appendix

Paper C

Yet Another Sub-Optimal Estimator of Sinusoids in Noise

Authors:
Dr. C

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Yet Another Sub-Optimal Estimator of Sinusoids in Noise

Dr. C

Abstract

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1 Introduction

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Paper D

An example of a yet-to-be-submitted paper

Authors:
Dr. C

To be submitted.

An example of a yet-to-be-submitted paper

Dr. C

Abstract

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