



NTNU – Trondheim
Norwegian University of
Science and Technology

Cyber Insurance

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Norwegian University of Science and Technology
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Abstract

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And after the second paragraph follows the third paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

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Preface

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Chapter 1

Example

Here is an example of how to use acronyms such as Norwegian University of Science and Technology (NTNU). The second time only NTNU is shown and if there were several you would write NTNUs. And here is an example¹ of citation [?].

This is the second paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

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¹A footnote

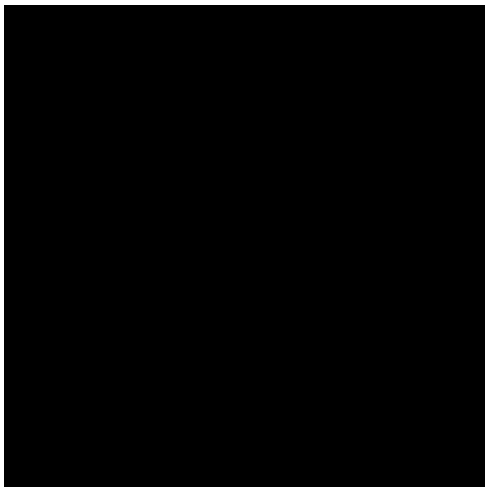


Figure 1.1: A figure

This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

1.1 First section

1.1.1 First subsection with some *Math* symbol

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

- item1
- item2
- ...

1.1.2 Mathematics

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. $\sin^2(\alpha) + \cos^2(\beta) = 1$. If you read this text, you will get no information $E = mc^2$. Really? Is there no information? Is there a

Table 1.1: A table

a	b	c	d	e
f	g	h	i	j
k	l	m	n	o
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u	v	w	x	y
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Proposition 1.1. *A proposition... (similar environments include: theorem, corollary, conjecture, lemma)*

Proof. And its proof. □

1.1.3 Source code example

Algorithm 1.1 The Hello World! program in Java.

```
class HelloWorldApp {
    public static void main(String[] args) {
        //Display the string
        System.out.println("Hello World!");
    }
}
```

You can refer to figures using the predefined command like Figure 3.1, to pages like page 9, to tables like Table 3.1, to chapters like Chapter 1 and to sections like Section 3.2 and you may define similar commands to refer to proposition, algorithms etc.

Chapter 2

Chapter 1

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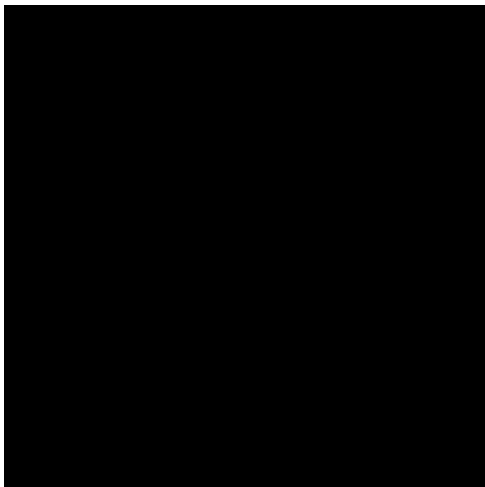


Figure 2.1: A figure

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2.1.2 Mathematics

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Proposition 2.1. *A proposition... (similar environments include: theorem, corollary, conjecture, lemma)*

Proof. And its proof. □

2.1.3 Source code example

Algorithm 2.1 The Hello World! program in Java.

```
class HelloWorldApp {
    public static void main(String[] args) {
        //Display the string
        System.out.println("Hello World!");
    }
}
```

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Chapter 3

Relatedwork

3.1 Towards Insurable Network Architectures

A trusted component or system is one you can insure. Cyber insurance gives an incentive to better secure your network, and will thus reduce the overall threat for both first and third parties. It will also promote gathering and sharing of information related to security incidents. All in all this will increase the social welfare by decreasing the variance of losses. But even if cyber insurance seems very profitable for everyone, it has failed to evolve as much as expected. Some reasons for this, could be:

- lack of data to calculate premium.
- Underdeveloped demand due to missing awareness for cyber risks.
- legal and procedural hurdles in substantiating claim.

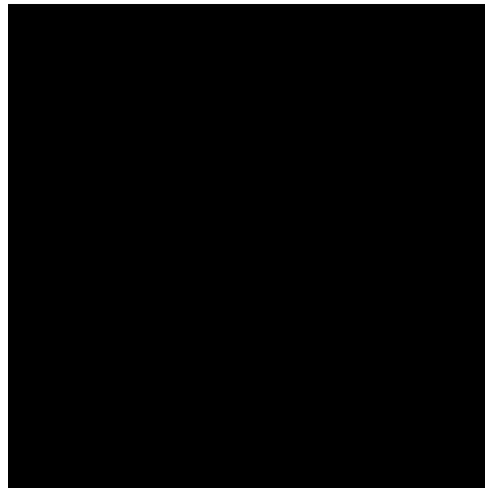


Figure 3.1: A figure

A more economic model to describe why cyber insurance is still such a niche market.

Interdependent security Expected loss due to security breach at one agent is not only dependent on this agents lvl of security, but also by other agents security investment. A good example is spam, it is dependent of number of compromised computers. This also generates an externality and encourages to free riding. which then leads to underinvestment in security.

Correlated risks Many systems share common vulnerabilities, which can be exploited at the same time. This leads to a more likely occurrence of extreme and catastrophic events, which will result in uneconomical supply of cyber insurance.

information asymmetry Since measuring security strength is very hard, people have a high incentive for hiding info. This leads to information asymmetry. All these three form a triple obstacle, which eliminates the market in evolving. All these obstacles evolve from what makes ICT succeed, distribution, interconnection, universality and reuse. This is why Architecture matters. The obstacles does not arrive from properties of individual agents, but from integration and interaction in networking. Networking is not just physical, but a abstract structure mapping physical, logical and social interconnection. A good example is development tool chains. A web-browser is not just dependent of the security the developers have implemented, but also the security in the tools used, such as libraries. These three problems have never been analysed together, this is what this paper contributes with. Uses GT to model incentives of the different agents.

3.2 Cyber insurance as an Incentive for Internet Security

so far the risk management on the internet has involved methods to reduce the risks(firewalls, ids, prevention etc.) but not eliminate risk. Is it logical to buy insurance to protect the internet and its users. An important thing to notice when insuring internet, is that the entities on the internet are correlated, which means insurance claims will likely be correlated. Risks are interdependent, decision by an entity to invest in security affects the risks of others. Key result: using insurance would increase the overall security. Act as an powerful incentive, which pushes entities over the threshold where they invest in self-protection. Insurance should be an important component of risk management in the internet.

Four typical options available in the face of risks. 1. avoid the risk 2. retain 3. self protect and mitigate 4. transfer the risk. Most entities in the internet have choses a mix of 2 and 3. This has lead to lots of systems trying to detect threats and anomalies(both malicious and accidental) and to protect the users and the structure from these. but this does not eliminate risk, threats evolve over time and there is

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always accidents. How to handle this residual risk? Option 4, transfer the risk to another entity who willingly accept it(hedging), insure in exchange for a fee. Allows for predictable payouts for uncertain events. But does this makes sense for the internet, benefits, to whom? and to what extent?

How to model unsurance and computing premiums.

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Algorithm 3.1 The Hello World! program in Java.

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        System.out.println("Hello World!");  
    }  
}
```

3.2.3 Source code example

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