

# Analysis and synthesis of inductive families

Hsiang-Shang Ko

14th April 2013



# Contents

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b>Introduction</b>   | <b>1</b>  |
| <b>2</b> | <b>From intuitionistic type theory to dependently typed programming</b> | <b>3</b>  |
| <b>3</b> | <b>Ornaments, refinements, and upgrades</b>                             | <b>5</b>  |
| <b>4</b> | <b>Categorical organisation of ornament-induced refinements</b>         | <b>7</b>  |
| <b>5</b> | <b>Relational algebraic ornaments</b>                                   | <b>9</b>  |
| <b>6</b> | <b>Equivalence of ornaments and relational algebras</b>                 | <b>11</b> |
| <b>7</b> | <b>Conclusion</b>   | <b>13</b> |



# Chapter 1

## Introduction

```
data Nat : Set where
  zero : Nat
  suc  : Nat → Nat
```



## Chapter 2

# From intuitionistic type theory to dependently typed programming





## Chapter 3

# Ornaments, refinements, and upgrades

Chapter 2

McBride [2011] [McBride, 2011] McBride's work [2011]



## Chapter 4

# Categorical organisation of ornament-induced refinements



## Chapter 5

# Relational algebraic ornaments



## Chapter 6

# Equivalence of ornaments and relational algebras





## Chapter 7

## Conclusion



# Bibliography

Conor McBride. Ornamental algebras, algebraic ornaments. To appear in *Journal of Functional Programming*, 2011.