

SYSTEM MODELLING WITH LOGIC AND DISCRETE MATHEMATICS

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1. INTRODUCTION

- Constructing Dependable Systems
- Direct techniques for dependable systems: formal models
- Difficulties (real and imaginary) of constructing formal models
- Support tools for modelling

1 hour

2. MODELS AND CORRECTNESS

- Event-B: a language for specifying models
- Static and dynamic components of Event-B models
- Proof obligations of an Event-B model
- Modelling by stepwise refinement: what is a refinement of a model in Event-B
- Labelled transitions semantics of Event-B
- Proof obligations of a refinement
- Animation of an Event-B model using ProB

3 hours

3. MODELLING WITH SETS

- The Event-B language of sets
- Sets as types
- Sets for object classification
- Case study: Model of a landing gear

2 hours

4. EXPRESSING PROPERTIES IN PREDICATE LOGIC

- The Event-B language of Propositional and Predicate logic
- Proof obligations revisited
- The Event-B language of functions and relations
- Case study: expressing properties of a social network

3 hours

5. PROVING A MODEL

- Discharging proof obligations interactively
- The variety of Rodin provers
- Strategies for discharging proofs

1 hour