MIT(16.399) - Abstract Interpretation (Patrick Cousot)

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This is more like a summary of all the lecture slides presented in ordered manner.

1 OVERVIEW OF ABSTRACT INTERPRETATION

- Static Analysis:
- Semantics & Undecidability:
- Safety Proofs:
- Abstract Interpretation & Formal Methods :
- Trace Semantics :
- Collecting Semantics :
- Abstracting Sets & Concretization :
- Convergence Acceleration :
- Interval Analysis:
- Refinement of Abstractions :
- Combinations of Abstractions :
- Backward & Forward Analysis :

2 SOFTWARE VERIFICATION PROBLEM

3 ABSTRACT INVARIANCE AND TERMINATION PROOFS

4 SET THEORY

- **5 OPERATIONAL SEMANTICS**
 - 6 FIRST ORDER LOGIC
- 7 PROGRAM SPECIFICATIONS
- **8 COLLECTING SEMANTICS**
 - 9 Lattice theory 1
 - 10 Lattice theory 2
- 11 Ordered Maps & Galois Connections 1
- 12 ORDERED MAPS & GALOIS CONNECTIONS 2
 - 13 FIXPOINT THEORY 1
 - 14 FIXPOINT THEORY 2
 - 15 Abstraction 1
 - 16 Abstraction 2

17 Post Condition Semantics

18 APPROXIMATION

- 19 Non-relational monotonic finitary static analysis 1
- 20 Non-relational monotonic finitary static analysis 2
 - 21 FORWARD NON-RELATIONAL INFINITARY STATIC ANALYSIS
 - 22 FORWARD RELATIONAL FINITARY STATIC ANALYSIS
- 23 ITERATED FORWARD/BACKWARD RELATIONAL INFINITARY STATIC
 ANALYSIS