



Ptolemy II

modeling, simulation, and design of concurrent, real-time, embedded systems

Project Director: Prof. Edward A. Lee

What is Ptolemy II?

Ptolemy II is a software framework developed as part of the Ptolemy project. It is a Java-based component assembly framework with a graphical user interface called Vergil. Vergil itself is a component assembly defined in Ptolemy II.

The Ptolemy project studies modeling, simulation, and design of concurrent, real-time, embedded systems. The focus is on assembly of concurrent components. The key underlying principle in the project is the use of well-defined models of computation (MoCs) that govern the interactions between components. A major problem area being addressed is the use of heterogeneous mixtures of models of computation.

The Ptolemy project has pioneered heterogeneous modeling, hybrid system simulation, actor-oriented design, and model-based design; formalized models of computation (MoCs) and their interactions; introduced the notions of domain polymorphism and component specialization; applied modern type system concepts to actor-oriented design; and produced high-quality design tools encapsulating these principles.



The project is named after Claudius Ptolemaeus, the second century Greek astronomer, mathematician, and geographer.

Modeling

Simulation

Design

Visualization

Models of Computation

- CT: continuous-time modeling (linear and nonlinear ODEs)
- DE: discrete-event modeling
- FSM: finite state machines (and modal models)
- PN: process networks (Kahn & MacQueen)
- SDF: synchronous dataflow
- CSP: communicating sequential processes (Hoare)
- CI: component interaction (push/pull)
- DDE: distributed discrete events (Chandy & Misra)
- DT: discrete time models
- Giotto: periodic time-driven models (Henzinger, et. al)
- GR: animated 3-D graphics
- SR: synchronous/reactive (after Esterel, Signal, Lustre)
- TM: timed multitasking (RTOS process interactions)
- HyVisual: hybrid systems simulation