

VisibleSim Manual

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April 22, 2015

1 Introduction

VisibleSim is a general discrete event simulator (DES) for modular robot systems.

2 Installation

3 User applications in VisibleSim

3.1 Examples of applications

3.2 Implementing a new application

3.3 Running an application

3.3.1 C++ application

3.3.2 Meld application

3.3.3 Command line arguments

4 Embedded debugger

5 Local clock Simulation

VisibleSim supports local clock simulation. We present here the programming API and the clock model.

5.1 Programming API

5.2 Clock model

[1] proposes a general model for oscillators:

$$x(t) = x_0 + y_0 t + \frac{1}{2} D t^2 + \epsilon(t) \quad (1)$$

where t is the simulation time (ie. real-time), $x(t)$ is the local time, x_0 is the time offset, y_0 is the frequency offset, D is the frequency drift and $\epsilon(t)$ is the random noise. $\epsilon(t)$ is not deterministic. [2] assume that $\epsilon(t)$ follows a Gaussian distribution $\mathcal{N}(0, \sigma^2)$. [3] explains how to enhance DES with efficient local clock simulation.

References

- [1] David W Allan. Time and frequency(time-domain) characterization, estimation, and prediction of precision clocks and oscillators. *IEEE transactions on ultrasonics, ferroelectrics, and frequency control*, 34(6):647–654, 1987.
- [2] Liangping Ma, Hua Zhu, Gayathri Nallamothu, Bo Ryu, and Heidi Howard. Understanding linear regression for wireless sensor network time synchronization. In *Proceedings of the 2007 International Conference on Wireless Networks, June 25-28, 2007, Las Vegas, Nevada, USA*, pages 325–328, 2007.
- [3] Felix Ring, Anetta Nagy, Georg Gaderer, and Patrick Loschmidt. Clock synchronization simulation for wireless sensor networks. In *Sensors, 2010 IEEE*, pages 2022–2026. IEEE, 2010.