Lab 5: Time Synchronization Algorithms – part 1

CSE 4215/5431: Mobile Communications

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We will begin our investigation of time synchronization algorithms this week. There are many that have been used. Please refer to [1] for a survey of many of these algorithms (in the context of sensor networks).

In this laboratory assignment, you will implement the algorithm proposed in Elson et al [2]. This will run on top of the mobility and radio range models you developed in the earlier labs. That is, earlier, your nodes were exchanging messages using two different radio range models and two different mobility models, but the messages were not being used. In this simulation, the nodes will perform time synchronization using those packets.

1   Questions to be addressed

You will replicate the results of sections 4.1 and 4.2 in [2], using DoI =0.0, 0.1 in both the DoI and the RIM model and using the random waypoint model with no pauses at waypoints.

2   Details of your simulation

As before, you can work in Java or C/C++, or you can use MatLab. The latter makes it easier to plot data, and provides built in random number generators for many probability distributions.

The RBS parameters should be taken from Section 4.1. in [2].

3   Report and code

You will submit a report and all your code after the next lab. In preparation for that, record the metrics described before and write a brief (a few paragraphs) description of what you did, design choices or assumptions you made (if any) and what you could infer from your results.

Document your code so that the grader can easily follow what you are doing.

References

[1] Clock Synchronization for Wireless Sensor Networks: A Survey. *Bharath Sundararaman, Ugo Buy, and Ajay D. Kshemkalyani* Ad Hoc Networks 281-323 (2005).

[2] Fine-grained network time synchronization using reference broadcasts *Jeremy Elson, Lewis Girod, Deborah Estrin* ACM SIGOPS Operating Systems Review - OSDI '02: Proceedings of the 5th symposium on Operating systems design and implementation —newblock Volume 36 Issue SI, Winter 2002.

Can be found at `http://portal.acm.org/citation.cfm?id=844143`