1113-35-192 **Michael Pokojovy*** (michael.pokojovy@uni-konstanz.de), Dept. of Mathematics and Statistics, University of Konstanz, 78457 Konstanz, Germany, and **J. Marcus Jobe** (jobejm@miamioh.edu), Information Systems and Analytics Dept., Farmer School of Business, Miami University, Oxford, OH 45056. *On Distributed Systems with Noisy Observations.*

Let X be a separable Hilbert space and let the linear operator A generate a C_0-semigroup on X. Within the framework of linear control theory, the observation problem on a finite time horizon $T > 0$ typically reads as

$$\begin{aligned} \dot{z}(t) &= Az(t) \text{ for } t \in (0,T), \quad z(0) = x, \\ w(t) &= Cz(t) \text{ in } (0,T) \end{aligned}$$

for some observation operator C.

In this talk, we assume the observation variable w to be 1D and consider a noisy system given by

$$\begin{aligned} \dot{z}(t) &= Az(t) \text{ for } t \in (0,T), \quad z(0) = x, \\ w(t_k) &= Cz(t_k) + \varepsilon(t_k) \text{ for } k = 1, \ldots, n, \end{aligned}$$

where $t_k = Tk/n$ and $\varepsilon(t_k)$'s are i.i.d. univariate r.v. with mean 0 and variance $\sigma^2 > 0$. Note that the system is now observed over a discrete set of time periods.

Assuming the deterministic system is exactly observable at time T, we use the taut string estimator from nonparametric statistics to construct an estimate $\hat{x}_n$ for the initial state x based on noisy observations and prove $\hat{x}_n$ converges in appropriate sense to the actual initial state x reconstructed from the original deterministic system at the optimal rate of $n^{-1/2}$. (Received August 21, 2015)