

2007:4  
Självständigt arbete i matematik  
Matematiska institutionen  
Stockholms universitet

## **Jonas Klingberg: Some Mathematical Aspects on Signals and Sampled Data**

### **Sammanfattning**

With the massive advances in computer technology over the last few decades, digital sampled data processing is everywhere in the technological world surrounding us. The aim of the first two chapters of this report is to provide a concise review of some of the theoretical background to the applied mathematics used in this context. The most common integral transforms are introduced in a way that emphasizes their interrelations. With the aid of some basics of distribution theory, a simple form of the Poisson summation formula and subsequently the Whittaker-Shannon sampling theorem are derived.

The third and finishing chapter constitutes a brief introduction to the so called ‘lifting technique’, which – somewhat simplified – takes on the task of providing time-invariant representations of innate periodically time-variant sampled-data systems and thus making them accessible to  $\mathcal{H}_2$  and  $\mathcal{H}_\infty$ -control.