CHALMERS | GÖTEBORG UNIVERSITY

Filosofie doktorsexamen

För att avlägga filosofie doktorsexamen i matematisk statistik vid Göteborgs Universitet har Catrin Bergkvist skrivit en uppsats med titeln

Circular Data Analysis of Repeated Measurements
- Inspired by Growth Hormone Data .

och kommer att hålla ett seminarium 2003-10-31 kl 13:15 i hörsalen, Eklandagatan 86, Chalmers tekniska högskola och Göteborgs universitet. Opponent är Docent Ulf Strömberg, Lunds universitet.

Avhandlingen finns tillgänglig på sektionens bibliotek. Ett kort referat ges nedan.

Abstract

The hallmark of growth hormone (GH), the major protein of the anterior pituitary is its spontaneous endogenous secretion in a pulsatile fashion over a 24-hour period. GH is the only hormone that affects growth in a dose-dependent manner; too much leads to gigantism and too little leads to a hypophysial dwarfism. Although a great deal of effort has been made and is still being made to explain how GH works, using data from spontaneous GH secretion as a diagnostic tool is still mainly unexplored.

This thesis discusses methods to describe repeated measures of GH in serum. First we describe methods to analyse whether peak frequency or amplitude of the GH pulses changes during a 24-hour period. Both four simulated examples and an application to a real data set are analysed. Then the shape of a pulse is estimated and finally a joint frequency-time transformation is used to reduce noise in data to improve the previous methods.

Keywords; pulsatile pattern, circadian rhythm, repeated measurements, circular data analysis, isotonic regression, joint frequency-time transformations