A U S H A N G

FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

D I S P U T A T I O N

Freitag, 8. Juni 2018, 11.00 Uhr

Ort: SR 006/T9, Seminarraum 006, Takustr. 9, 14195 Berlin

Disputation über die Doktorarbeit von

Frau Martina Klimm

Thema der Dissertation:

New Strategies in Conformation Dynamics

Investigation of the μ-opioid receptor in healthy and inflamed tissue

Thema der Disputation:

Nonnegative matrix factorization

Applications and algorithms

Die Arbeit wurde unter der Betreuung von **Priv.-Doz. Dr. M. Weber** durchgeführt.

Abstract: Nowadays, tons of data are being generated every day. This high-dimensional data becomes only useful when having been processed. One powerful tool is the linear dimensionality reduction. Since data in nature is often nonnegative, we seek to approximate the given data with the product of two low-rank nonnegative matrices, so that these factors can be interpreted in the same way as the data. These nonnegative constraints lead to a closer physical representation but increase the complexity of the problem to that it is more difficult to solve.

Nonnegative matrix factorization (NMF) became popular after an article by Lee and Seung in 1999 (*Learning the parts of objects by non-negative matrix factorization*, Nature 401). They argued that human perception is based on an additive representation, tending to expose parts of the data. One of the major applications of NMF is the representation of human faces that was introduced by Lee and Seung. In the first part of the talk, it will be explained how to find features in images like parts of faces, and some other application areas will be presented.

In the second part of the talk, the problem of solving NMF will be addressed. Some problems will be discussed and several standard algorithms presented. Finally, a geometric interpretation of NMF and a geometric approach to solve NMF will be given.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

Interessierte werden hiermit herzlich eingeladen

Der Vorsitzende der Promotionskommission
Priv.-Doz. Dr. M. Weber