ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS

ΣΧΟΛΗ ΕΠΙΣΤΗΜΩΝ & ΤΕΧΝΟΛΟΓΙΑΣ ΤΗΣ ΠΛΗΡΟΦΟΡΙΑΣ
SCHOOL OF INFORMATION SCIENCES & TECHNOLOGY

ΤΜΗΜΑ ΣΤΑΤΙΣΤΙΚΗΣ
DEPARTMENT OF STATISTICS

ΚΥΚΛΟΣ ΣΕΜΙΝΑΡΙΩΝ ΣΤΑΤΙΣΤΙΚΗΣ ΝΟΕΜΒΡΙΟΣ 2018

Λάμπρος Μπουράνης

University College Dublin

Bayesian model selection for exponential random graph models via adjusted pseudolikelihoods

ΠΕΜΠΤΗ 8/11/2018
13:00

ΑΙΘΟΥΣΑ Τ101, 1ος ΟΡΟΦΟΣ
ΝΕΟ ΚΤΙΡΙΟ ΟΠΑ, (ΤΡΟΙΑΣ 2)

ΠΕΡΙΛΗΨΗ

Models with intractable likelihood functions arise in areas including network analysis and spatial statistics, especially those involving Gibbs random fields. Posterior parameter estimation in these settings is termed a doubly intractable problem because both the likelihood function and the posterior distribution are intractable. The comparison of Bayesian models is often based on the statistical evidence, the integral of the un-normalized posterior distribution over the model parameters which is rarely available in closed form. For doubly intractable models, estimating the evidence adds another layer of difficulty. Consequently, the selection of the model that best describes an observed network among a collection of exponential random graph models for network analysis is a daunting task. Pseudolikelihoods offer a tractable approximation to the likelihood but should be treated with caution because they can lead to an unreasonable inference. This talk specifies a method to adjust pseudolikelihoods to obtain a reasonable, yet tractable, approximation to the likelihood. This allows implementation of widely used computational methods for evidence estimation and pursuit of Bayesian model selection of exponential random graph models for the analysis of social networks. Empirical comparisons to existing methods show that our procedure yields similar evidence estimates, but at a lower computational cost.

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DEPARTMENT OF STATISTICS

AUEB STATISTICS SEMINAR SERIES NOVEMBER 2018

Lampros Bouranis
University College Dublin

Bayesian model selection for exponential random graph models via adjusted pseudolikelihoods

THURSDAY 8/11/2018
13:00

ROOM T101, 1ST FLOOR,
NEW AUEB BUILDING, (TROIAS 2)

ABSTRACT

Models with intractable likelihood functions arise in areas including network analysis and spatial statistics, especially those involving Gibbs random fields. Posterior parameter estimation in these settings is termed a doubly intractable problem because both the likelihood function and the posterior distribution are intractable. The comparison of Bayesian models is often based on the statistical evidence, the integral of the un-normalized posterior distribution over the model parameters which is rarely available in closed form. For doubly intractable models, estimating the evidence adds another layer of difficulty. Consequently, the selection of the model that best describes an observed network among a collection of exponential random graph models for network analysis is a daunting task. Pseudolikelihoods offer a tractable approximation to the likelihood but should be treated with caution because they can lead to an unreasonable inference. This talk specifies a method to adjust pseudolikelihoods to obtain a reasonable, yet tractable, approximation to the likelihood. This allows implementation of widely used computational methods for evidence estimation and pursuit of Bayesian model selection of exponential random graph models for the analysis of social networks. Empirical comparisons to existing methods show that our procedure yields similar evidence estimates, but at a lower computational cost.