موسسه زمین و محیط زیست استراسبورگ پژوهشگاهی تلفیقی تحت مدیریت مشترک مرکز ملی پژوهش علمی فرانسه، دانشگاه استراسبورگ و مدرسه ملی مهندسی آب و محیط زیست استراسبورگ است.

اهداف: برنامه بورس فرصت مطالعاتی کارشناسی ارشد با هدف ایجاد فرصت تعامل برای دانشجویان ایرانی مقطع کارشناسی ارشد حوزه آب و توسعه پایدار و کسب تجربه بین‌المللی در پژوهشگاه فاخر دانشگاه استراسبورگ طراحی شده است.

2024 Internship research offer: Investigating the Impact of Sample Size on Estimated Prediction Intervals in Groundwater Models for Uncertainty Analysis

Groundwater models are essential tools for understanding and managing water resources. However, the inherent uncertainty in input parameters poses a challenge to accurate predictions. This uncertainty arises from both stochastic properties and gaps in knowledge about parameter values. This study focuses on the crucial aspect of uncertainty analysis: the estimation of prediction intervals and how it is influenced by the size of the sample used. During simulation, uncertainties in model inputs propagate through the groundwater model, leading to uncertainty in output quantities of interest. This process, known as uncertainty propagation analysis, is fundamental for robust modeling. Sampling techniques play a vital role in various algorithms designed for uncertainty analysis in groundwater models. Depending on the type of analysis, sampling can be input-oriented or output-oriented. Input-oriented methods, such as Monte Carlo simulation, GLUE type methods, sensitivity analysis, and design of experiments, are our focus in this study.

Real-world groundwater models often exhibit highly non-linear and complex response surfaces, coupled with large parameter and problem spaces, making them high-dimensional with significant uncertainty at each dimension. Moreover, these models demand high computational resources, leading to extended run times. These challenges hinder the effective use of sampling-based analyses for uncertainty estimation.

In light of the above-mentioned challenges, this research aims to address two key questions: i) Effect of Sample Size on Estimated Prediction Intervals and ii) Improving Prediction Intervals by Adjusting Sample Size:

To answer these questions, we will employ different groundwater models with varying complexities. Our investigation will involve extensive sampling to adequately capture the non-linearity of response surfaces, explore the high-dimensional parameter space, and account for computational demands. By systematically varying sample sizes using advanced sampling algorithms, we aim to uncover insights into the relationship between sample size and the reliability of prediction intervals. Understanding the influence of sample size on prediction intervals is crucial for enhancing the reliability of groundwater models and improving decision-making in water resource management. Our findings will contribute to the refinement of uncertainty analysis techniques, making them more applicable to real-world groundwater modeling scenarios.

In conclusion, this research seeks to bridge the gap in knowledge regarding the impact of sample size on prediction intervals in groundwater models, offering valuable insights for researchers, practitioners, and policymakers involved in water resource management. We are looking for a Master 2 student or a student in last year of an engineering school in the field of hydrogeology, numerical modelling, civil engineering or water resources.

تقویم

1. **تا 25 اسفند 1402:** مهلت ارسال پرونده داوطلبی به fahs@unistra.fr ؛
2. **27 فروردین 1403:** اعلام نتایج و شروع روند اخذ روادید ؛
3. **شهریور تا بهمن 1403:** فرصت مطالعاتی کارشناسی ارشد در فرانسه.

شرایط لازم

- ملیت ایرانی و سکونت در ایران ؛
- اشتغال به تحصیل در مقطع کارشناسی ارشد ؛
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- حداکثر 32 سال سن تا 12 دیماه 1403.

امتیازات بورس طی مدت مربوطه

- اقامت در فرانسه به مدت شش ماه وکمک هزینه ماهانه 900 یورو ؛
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Programme de bourses de stage de master
« Eau et développement durable »
APPEL À CANDIDATURES 2024

1/3 – The applicant

Civil status

Name		Photograph
First name		
Date of birth		
Birthplace		
Nationality		
Personal status		
Passport number		
Complete Address		
Mobile phone		
Mailing Address		

Current position

Position	
Field	
University – Research Institute / Workplace	

Academic background

Year	Academic degree / Specialization	Institution	Comments

Professional experience

Year	Occupation	Institution	Comments

References

Name	Position	Organization	Email

Languages proficiency (*basic, medium, fluent)*

Language	Reading	Writing	Comprehension

Cover letter *(scientific added-value, professional perspectives, and motivation)*

3/3 Required documents in English or French (to be attached to the Application Form)

1. Birth certificate
2. Copy of highest degrees
3. Copies of languages' proficiency tests in English or French
4. CV in English with the list of publications, awards, patents, and previous grants, if any

Should there be any question about the program, please contact fahs@unistra.fr

Nota bene: Please note that late or incomplete submissions will not be considered, as well as any applications, which do not satisfy the eligibility criteria. Each candidate who will have submitted his file in due time will receive an acknowledgment of receipt within 72 hours.

I declare that all the above information, from page 1 to 5, as well as the information provided in the attached documents are correct and *bona fide*.

I agree with the conditions of the program and the selection criteria. If I am selected, I acknowledge that not completing next steps' process in due time (completion of visa procedures, etc.), with no proper reasons, will expose to reducing the length or cancelling the benefit of the scholarship. I acknowledge that any scholarship will not be valid after the end of the year 2024.

If I am selected, I will be keen to deliver documents (video, exhibition, talk, etc.) to enhance my participation in the program towards specialists' and non-specialists' audience.

Place: Applicant's Signature:

Date: