Xinxin ZHANG 张新鑫

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Beihang University, Beijing, China
Male, 24, born on May 11th,1999

EDUCATION

Beihang University (China 985 Project) 2021.09-2023.12(Expected)
Power Engineering and Engineering Thermophysics Master of research

- GPA **3.85/4.0**, ranking **4/71**
- Awarded with First-class scholarship for outstanding students(twice), Special Freshman Scholarship
- Advanced knowledge on Machine Learning, Computational methods, Optimization, etc

Nanjing University of aeronautics and astronautics (China 211 Project) 2017.09-2021.06
Flight Vehicle Propulsion Engineering Bachelor

- GPA **4.5/5.0**, ranking **1/220**
- Awarded with **China national scholarship**, Presidential scholarship(12 per year for all the undergraduates)
- Awarded with the first prize of national competition in both English & Mathematics
- General knowledge on Fluid dynamics, Thermophysics and Linear Algebra, etc

LANGUAGE PROFICIENCY CERTIFICATE

- IELTS Test: Overall band of **7.5**, 9 (full mark) in both Listening and Reading part
- GRE Test: **325**, 160 in Verbal Reasoning and 165 in Quantitive Reasoning

RESEARCH EXPERIENCE

Data-driven reconstruction of global physical field for turbine blades 2022.09-now
Master thesis Beihang University

- Objective:1.Sparse local sensor measurements →Online reconstruction of global physical fields of turbine blades.
  2.Theoretical determination of optimal sensor placements for better reconstruction.
- Methodology: 1. Formulate the physical field reconstruction problem under the compress sensing framework; 2. Feature learning of physical field distribution via POD(steady)/DMD(transient) algorithm; 3. QR factorization and determinant-based fast greedy algorithm utilized to optimize sensor layouts; 4. Reconstruct the whole physical field by approximating the sensor measurements via optimized combinations of extracted reduced-ordered features. 5. Uncertainty quantification of reconstruction results via Monte-Carlo Methods.
- Proposed reconstruction framework established and verified (SCI, Q1, under review)

ANN-aided Kalman filtering algorithm for transient Inverse heat transfer problem 2021.02-2022.09
Extension on bachelor thesis Beihang University

- Objective: Temporal evolution of sensor measurements → Time-varying unknown boundary condition
- Methodology: Applying extended Kalman filtering (EKF) algorithm to robustly estimate the unknown time-varying heat flux; Data fusion achieved between uncertain sensor measurements and numerical model of heat transfer process; Artificial neural network embedded into the EKF framework to accelerate the computation.
- Proposed ANN-EKS algorithm established and verified, already written as a SCI manuscript (under review)

Data-driven Remaining useful life estimation for Aero-engines 2019.04-2020.06
Academic internship for undergraduates Nanjing University of aeronautics and astronautics

- Objective: Condition monitoring data (NASA public dataset) → Remaining useful life estimation
- Methodology: Data cleaning and degradation features selection achieved via moving average filtering and correlation analysis; Health states clustering made by K-means algorithm; Health states classification achieved via deep forest classifier; Temporal trend forecasting obtained by LSTM networks; Combining LSTM forecasting and deep forest classifier to achieve the online remaining useful life estimation for Aero-engines.

Publications

- **Xinxin Zhang**, Lu Qiu*, Jianqin Zhu, Zhi Tao, Determinant-based sensor placement optimization for Data-driven Physical field reconstruction of Turbine Blades, International journal of thermal sciences. (SCI, Q1, under review)
- **Xinxin Zhang**, Dike Li, Zhi Tao, Lu Qiu*, Rapid online solution of inverse heat transfer problem by ANN-based extended Kalman smoothing algorithm, https://doi.org/10.48550/arXiv.2304.00021 (SCI, under review)
- **Xinxin Zhang** et al, A Rapid Online Estimation of Time Varying Thermal Boundary Conditions in Convective Heat Transfer Problem by ANN-Based Extended Kalman Smoothing Algorithm, 29th International Conference on Computational & Experimental Engineering and Sciences. (EI International conference, accepted)

SPECIAL SKILLS

- Proficient use in Matlab, C++, Python and Qt
- Proficient use in ANSYS Fluent, ICEM, CFD-post and Origin; Good at analytical writing and presentation