EPFL

EE-714 | **Nonlinear signal modeling and prediction**

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Cursus	Sem.	Type
Electrical Engineering		Obl.

Language of teaching	English
Credits	4
Session	
Exam	Multiple
Workload	120h
Hours	**56**
Courses	28
Exercises	28
Number of positions	**20**

Frequency

Every 2 years

Remark

Every 2 years. Next time : Spring 2020

Summary

The literature on nonlinear signal processing has exploded, and it becomes more and more difficult to identify the most useful approaches for specific contexts. This course presents promising developments for the practical application of nonlinear signal models in various fields of engineering.

Content

1. Introduction
2. Summary of linear AR and ARMA modeling
3. Nonlinear AR and ARMA modeling, polynomial models and their estimation
4. Specific nonlinear models (threshold AR, ...)
5. Neural network based modeling and prediction
6. Model selection
7. Chaos theory and applications
8. Kernel-based approaches
9. Laboratory exercises: application of nonlinear modeling/prediction to synthetic and experimental data

Keywords

Signal modeling, Signal prediction, Nonlinear autoregression, Parameter estimation.

Learning Prerequisites

Recommended courses

Statistical signal processing

Assessment methods

Multiple.