

Metode de optimizare pentru cresterea calitatii energiei electrice in sisteme electrice

Simulation of electric circuits

Obiectiv principal

Înșușirea de către studenți a cunoștințelor privind suportul teoretic al metodelor de optimizare, specifice aplicațiilor din ingineria electrică, precum și formarea de abilități în utilizarea tehnicii de calcul dedicate.

Course Objective

Acquire by students of knowledge of the theoretical support of optimization methods specific to electrical engineering applications as well as skills training in the use of dedicated computing techniques.

Curs

2 ore/săptămână, total 28 ore

- Optimizarea matematica.
- Notiuni matematice folosite in optimizare (gradienti, hesiene, functii liniare si patratice etc.)Conditii de optim.
- Multimi si functii convexe.
- Generalități asupra programării convexe.
- Programare liniară.
- Optimizare neliniara cu si fara constrangeri (Metode de tip Newton de optimizare, Multiplicatorii lui Lagrange, Programare patratice).
- Elemente de teoria controlului.
- Elemente de teoria wavelet.
- Optimizare si filtrare folosind wavelet-uri.

Course

2 hours weekly, 28 hours total

- Mathematical optimization.
- Mathematical notions used in optimization (gradients, hessian, linear and square functions etc.) Optimal conditions.
- Convex sets and convex functions.
- Generalities on convex programming.
- Linear programming.
- Nonlinear optimization with and without constraints (Newton Optimization Methods, Lagrange Multipliers, Quadratic Programming).
- Elements of control theory.
- Elements of wavelets theory.
- Optimization and filtering using wavelets.

Seminar

1 ora/săptămână, total 14 ore

- Optimizarea matematica.
- Notiuni matematice folosite in optimizare (gradienti, hesiene, functii liniare si patratice etc.)Conditii de optim.
- Multimi si functii convexe.
- Generalități asupra programării convexe.
- Programare liniară.
- Optimizare neliniara cu si fara constrangeri (Metode de tip Newton de optimizare, Multiplicatorii lui Lagrange, Programare patratice).
- Elemente de teoria controlului.
- Elemente de teoria wavelet.
- Optimizare si filtrare folosind wavelet-uri.

Seminar

1 hour weekly, 14 hours total

- Mathematical optimization.
- Mathematical notions used in optimization (gradients, hessian, linear and square functions etc.) Optimal conditions.
- Convex sets and convex functions.
- Generalities on convex programming.
- Linear programming.
- Nonlinear optimization with and without constraints (Newton Optimization Methods, Lagrange Multipliers, Quadratic Programming).
- Elements of control theory.
- Elements of wavelets theory.
- Optimization and filtering using wavelets.

Laborator

2 ore/săptămână, total 28 ore

- Programarea liniara plana.
- Calculul extremelor fara constrangeri.
- Calculul extremelor cu constrangeri.
- Algoritmul von Danzig de programare liniara
- Aplicatii ale programarii matematice la circuitele electrice.
- Descompunerea semnalelor.
- Filtrarea semnalelor electrice, avantaje si dezavantaje ale unor metode.

Laboratory

2 hours weekly, 28 hours total

- Planar linear programming.
- Calculating extremes without constraints.
- Calculation of extremes with constraints.
- The von Danzig algorithm of linear programming
- Applications of mathematical programming in electrical circuits.
- Decomposition of signals.
- Filtration of electrical signals, advantages and disadvantages of some methods.