Automatsko upravljanje 1

Visoka škola elektrotehnike i računarstva strukovnih studija

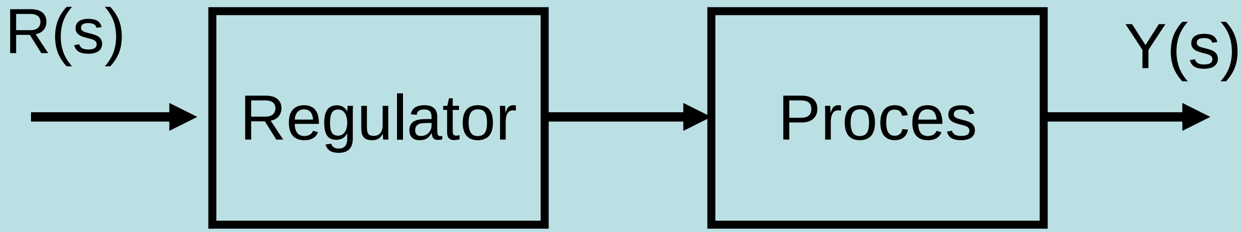
Profesor – dr Goran Dikić

Asistent – Slobodan Drašković

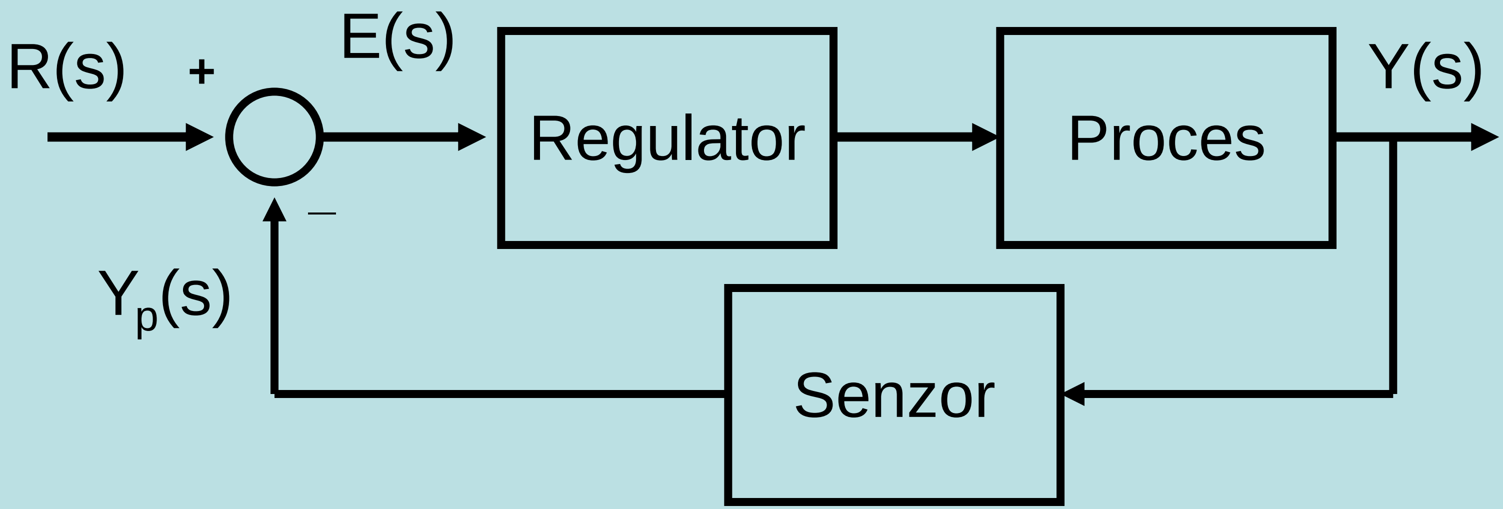
UVOD

1.1. Struktura sistema upravljanja
1.2. Podela sistema automatskog upravljanja

Osnovni tipovi SAU



Sa **otvorenom** petljom upravljanja



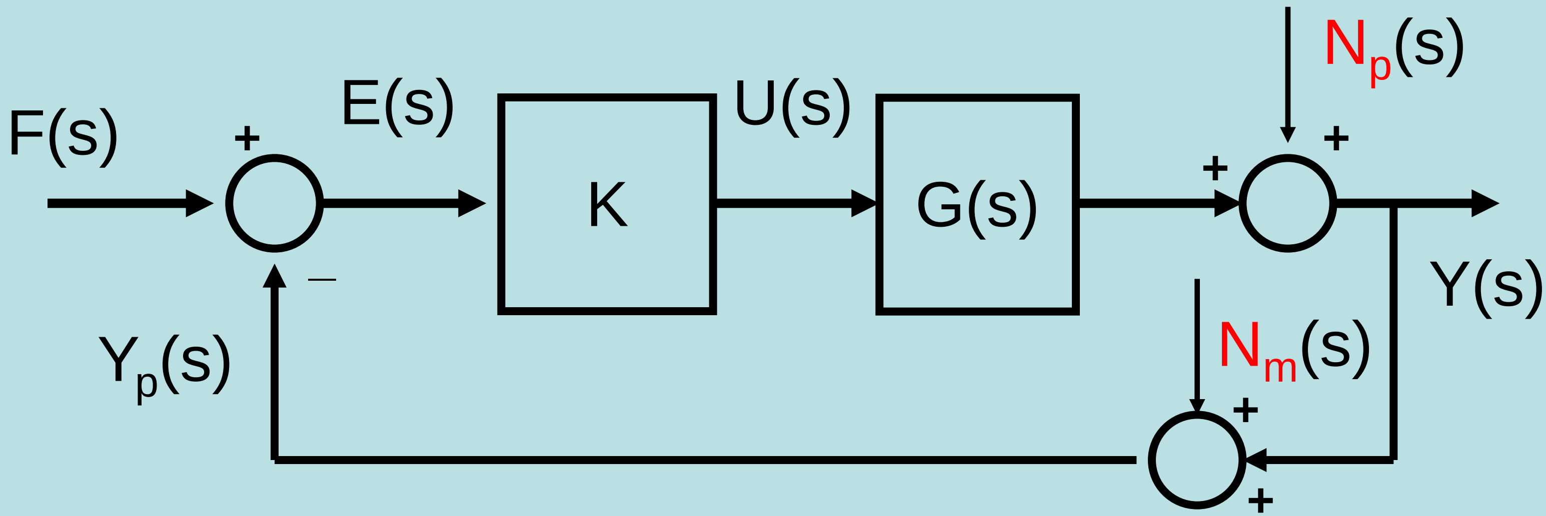
i **zatvorenom** petljom upravljanja

MATEMATIČKE OSNOVE MODELOVANJA PROCESA UPRAVLJANJA

2.1. Definisanje modela sistema
2.2. Matematičko modelovanje SAU
2.3. Laplasova transformacija
2.4. Funkcija prenosa

MODELOVANJE SISTEMA AUTOMATSKOG UPRAVLJANJA

Uticaj povratne sprege na odziv sistema



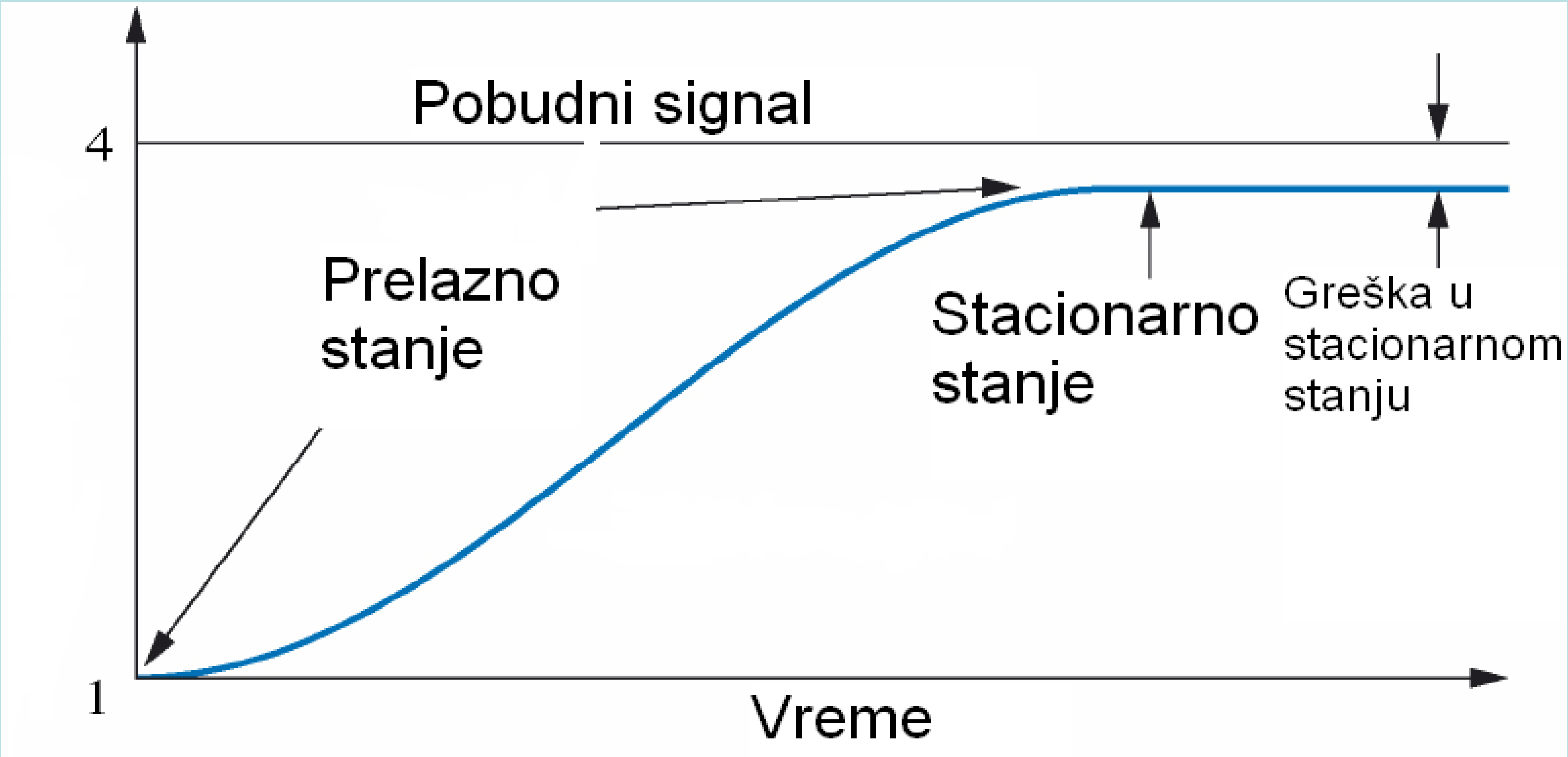
$$Y(s)=\frac{KG(s)}{(1+KG(s))}(\mathrm{F(s)}-\mathrm{N_m(s)})+\frac{1}{(1+KG(s))}\mathrm{N_p(s)}$$

$N_p(s)$, $N_m(s)$ – šumovi poremećaja i merenja

ANALIZA PONAŠANJA KONTINUALNIH SISTEMA AUTOMATSKOG UPRAVLJANJA

4.1. Zakoni uravljanja
4.2. Karakterizacija prelaznog režima
4.3. Karakterizacija stacionarnog stanja
4.4. Uticaj rasporeda polova i nula funkcije prenosa na odziv sistema

Ciljevi analize i sinteze SAU



Zahtevana **stabilnost**, **minimalna greška** u stacionarnom stanju i **oblik prelaznog odziva** SAU

STABILNOST SISTEMA AUTOMATSKOG UPRAVLJANJA

5.1. Hurvicov kriterijum
5.2. Rausov kriterijum

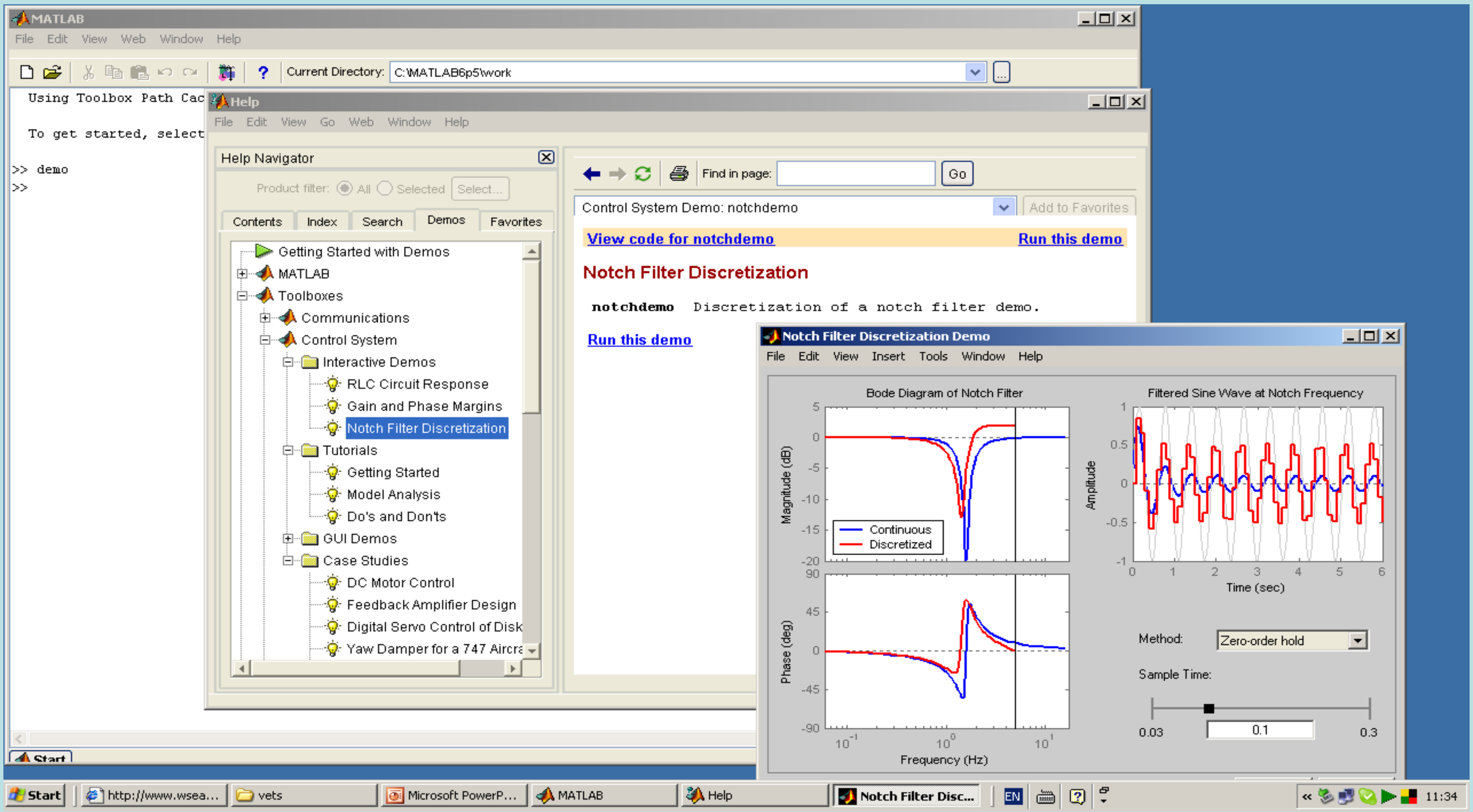
KARAKTERISTIKE SISTEMA AUTOMATSKOG UPRAVLJANJA U FREKVENIJSKOM DOMENU

6.1. Amplitudne karakteristike SAU
6.2. Fazne karakteristike SAU

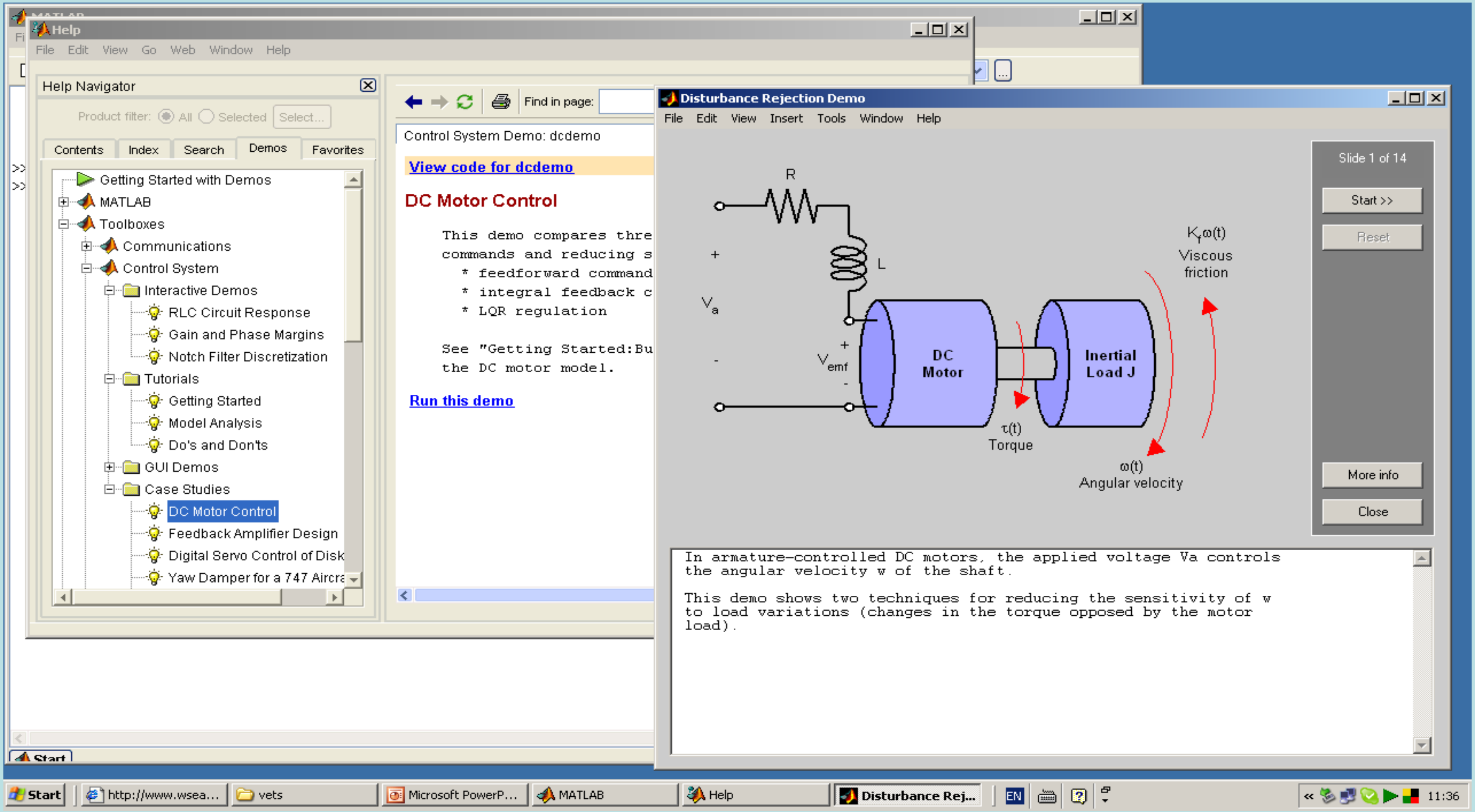
Matlab

- interaktivni program za numeričku obradu i vizuelizaciju podataka
- specijalizovana programska podrška za rešavanje širokog spektra naučno-tehničkih problema
- mogućnost primene u **Unix**, **Macintosh** i **Windows** okruženju

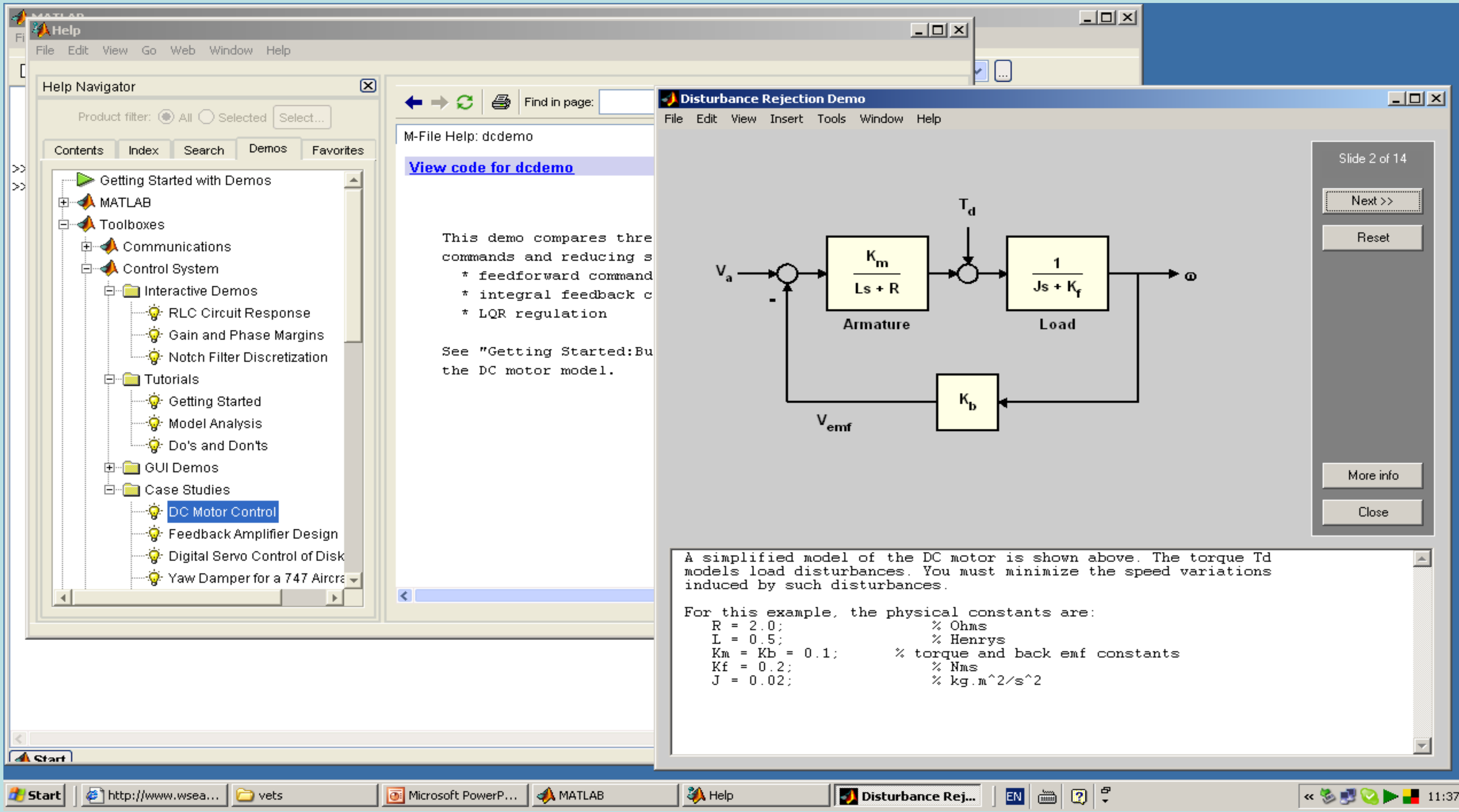
Bogat izbor Toolbox-ova



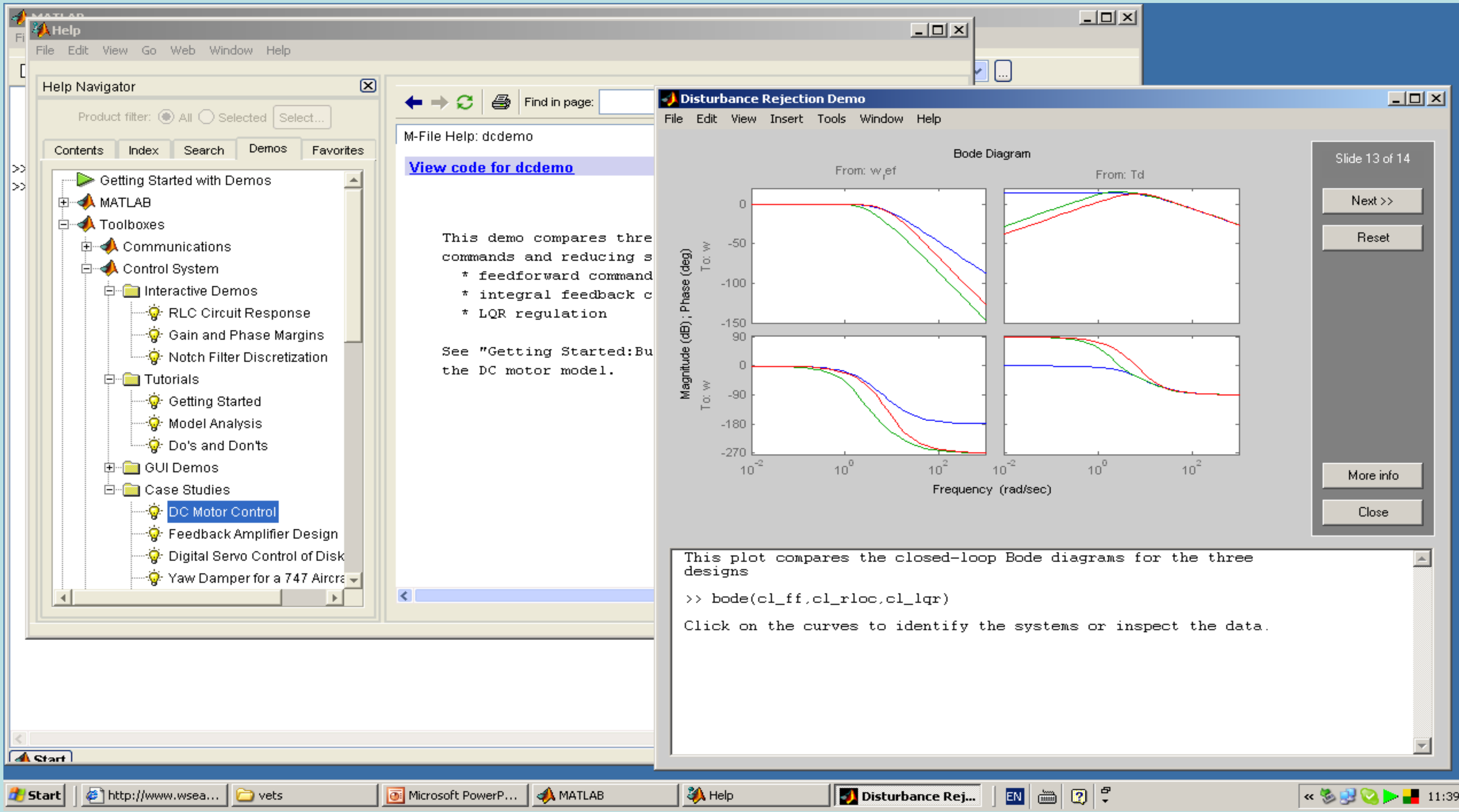
... detaljan prikaz mogućnosti na konkretnim primerima



MATLAB Demos




MATLAB Demos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Product filter: All Selected Select...
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RLC Circuit Response
Gain and Phase Margins
Notch Filter Discretization
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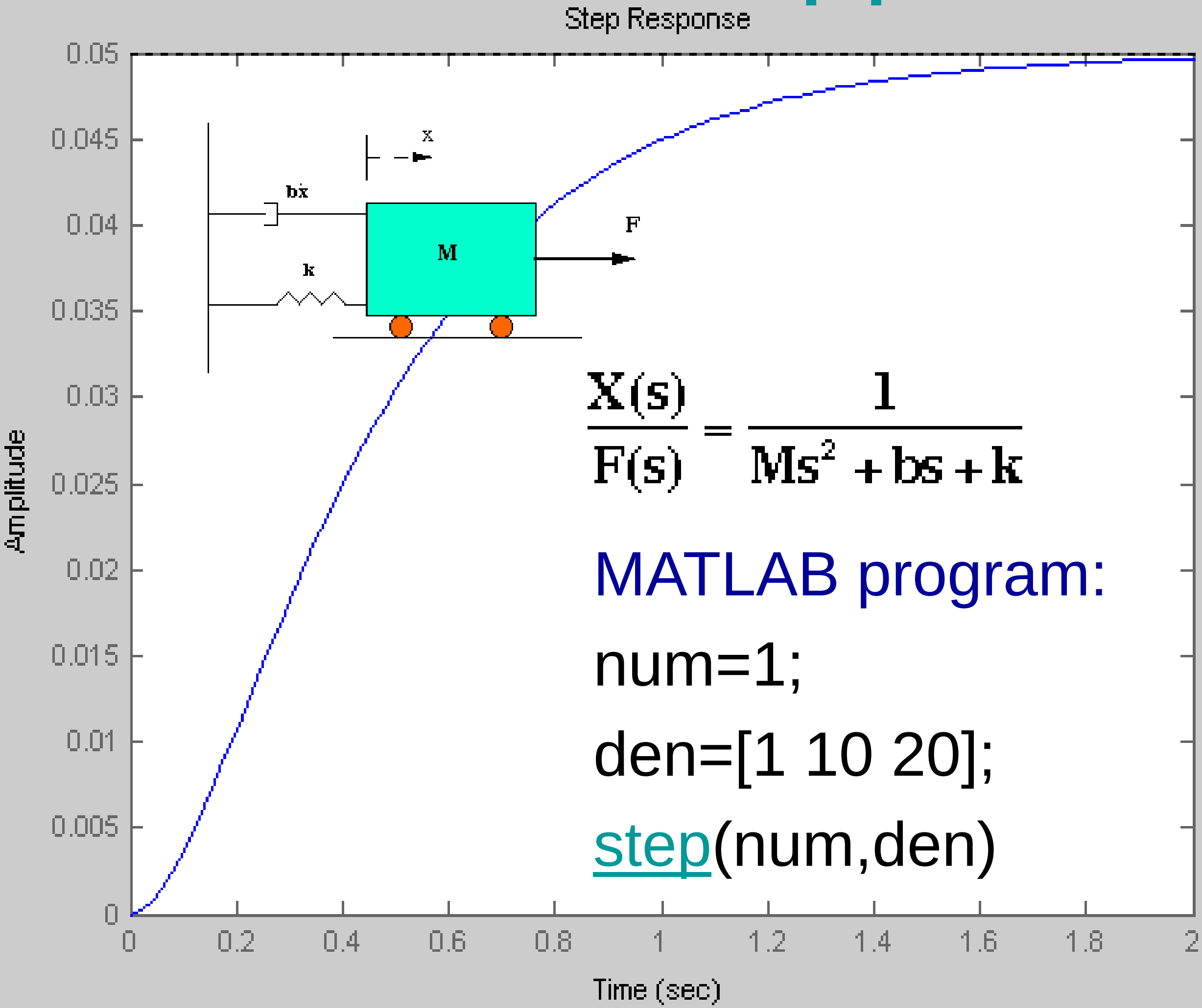
DC Motor Control
Feedback Amplifier Design
Digital Servo Control of Disk
Yaw Damper for a 747 Aircra
Find in page:
M-File Help: dcdemo
View code for dcdemo
This demo compares thre
commands and reducing s
* feedforward command
* integral feedback c
* LQR regulation
See "Getting Started:Bu
the DC motor model.
Disturbance Rejection Demo
File Edit View Insert Tools Window Help
Bode Diagram
From: w_ref
From: Td
Magnitude (dB) ; Phase (deg)
To: w
Frequency (rad/sec)
Slide 13 of 14
Next >>
Reset
More info
Close
This plot compares the closed-loop Bode diagrams for the three designs
>> bode(cl_ff,cl_rloc,cl_lqr)
Click on the curves to identify the systems or inspect the data.
Start
http://www.wsea...
vets
Microsoft PowerP...
MATLAB
Help
Disturbance Rej...
EN
11:39

Odziv sistema na step pobudu



$$\frac{X(s)}{F(s)} = \frac{1}{Ms^2 + bs + k}$$

MATLAB program:

```
num=1;
den=[1 10 20];
step(num,den)
```

OCENA IZ PREDMETA

Dva kolokvijuma (30+50 bodova)
Vežbe (20 bodova)

U slučaju klasičnog ispita (maksimalno 80 bodova na pismenom)