Electric Drive Systems (EPMN202) Research Project

Topic

Closed Loop Control of DC Motor Drives

Motor Data:

- A) 75kW, 1900rpm - DC Separately Excited Motor B) 85kW, 1900rpm - DC Separately Excited Motor
- A) 60V/1000rpm tacho-generator. B) 60V/700rpm tacho-generator.
- Armature: 400V, 207A DC continuously rated.
- Field: 220V, 6.18A
- Torque: 377Nm constant at continuous rating to 1900rpm.

Load Data:

- Type: Elevator
- Drum diameter: A) 90cm B) 93cm
- Empty Cabinet Weight: 200kg
- Counter Weight: Empty Cabinet Weight + 40%
- Maximum passenger weight: 150kg.

Control:

- Select between rectifier and chopper circuits (four-quadrant).
- Speed Profile: trapezoidal
- Max speed: A) 5 m/s B) 7 m/s
- Ramp up/down time: A) 3 seconds. B) 1 seconds C) 0 seconds

Deliverables:

One Report for each group covering:

1- Problem statement
2- Steady-state operating point for the fully-loaded elevator.
3- Closed-loop speed control model incorporating current control in MATLAB Simulink.
4- Conclusions.
5- References.

General Guidelines:

- Deadline for project submission: December 15th, 2022.
- First page of the report should show your full names in Arabic along with student ID number/section/bench number
- Number of students in each group: 8.
- Pay attention to formatting, page numbering, image/graph captions, image/graph numbering, table of contents, references, etc.
- Written report should be submitted in printed and PDF formats.
- Submission of PDF reports shall be though Blackboard.
- Sharing reports among different groups is strongly prohibited.

Grading will be based on:

- Correctness and completeness of analysis
- Correctness and completeness of the simulation model and results
- Ability to demonstrate that simulation results clearly verify design outputs.
- Report formatting, quality of graphs, and language integrity

Each Group Report:

	DC Motor	tacho-generator	Drum diameter	Max speed	Ramp time
Group 1 (Sunday)	A	B	A	B	A
Group 2 (Sunday)	B	A	B	A	B
Group 3 (Wed 8AM)	A	A	A	B	B
Group 4 (Wed 8AM)	A	B	B	A	C
Group 5 (Wed 8AM)	B	A	A	A	A
Group 6 (Wed 8AM)	B	B	B	B	C
Group 7 (Wed 1PM)	A	A	B	A	A
Group 8 (Wed 1PM)	A	B	A	B	C
Group 9 (Wed 1PM)	A	A	B	B	B
Group 10 (Wed 1PM)	B	A	B	B	C
Group 11 (Wed 1PM)	B	B	A	A	A