

UTKALINSTITUTEOFENGINEERING&TECHNOLOGY

DISCIPLINE: electricalengineering	SEMESTER: 6THSem	NAMEOFTHETEACHINGFACULTY: Engg PRIYADARSHINI PARIDA		
SUBJECT: Th3.CONTROL SVSTEM	No of Days/Per weekclassallotted:5Clas sP/W(60)	SemesterFromDate:16/01/2024 ToDate:26/04/ 2024 No.OfWeeks:12		
ENGINEERING				
WEEK	CLASSDAY	THEORYTOPICS <u>PART-AFUNDAMENTALOFCONTROLSYSTEM</u>	REMARKS	
1 st	1 st	Classification of Control system	Date	Dean/Principal
	2 _{nd}	Openloopsystem&Closedloopsystemanditscomparison		
	3rd	EffectsofFeed back		
	4 _{dh}	StandardtestSignals(Step,Ramp,Parabolic,ImpulseFunctions)an dServomechanism		
	5th	PARTBMATHEMATICALMODELOF ASYSTEM: Transfer Function&Impulseresponse		
2nd	1st	Properties, Advantages & Disadvantages of Transfer Function		
	2nd	Poles&ZeroesoftransferFunctionandSimpleproblemsoftransferfunction of network.		
	3rd	Mathematical model in gof Electrical Systems (R,L,C,Analogous systems)		
	4 _{th}	PARTCCONTROLSYSTEMCOMPONENTS: ControlSystem		
	5th	ComponentsofControlSystem		
3rd	1st	Gyroscope, Synchros, Tachometer, DCservomotors, Ac Servomotors.		
	2 _{nd}	Gyroscope, Synchros, Tachometer, DCservomotors, Ac Servomotors.		
	3rd	PARTDBLOCKDIAGRAMALGEBRA& SIGNAL FLOWGRAPHS: Definition:BasicElementsofBlockDiagram		
	4 _{dh}	CanonicalFormofClosedloopSystemsand Rules for Block diagram reduction		
	5th	ProcedureforofReductionofBlockDiagram		
4 _{th}	1 st	SimpleProblemforequivalenttransferfunction		
	2 _{nd}	BasicDefinitioninSignalFlowGraph&properties		
	3 _{rd}	Construction of Signal Flow graph from Block diagram		
	4 _{th}	Mason'sGainformula		
	5th	SimpleproblemsinSignalflowgraphfornetwork		
5th	lst	PARTETIMERESPONSEANALYSIS.: Time responseofcontrolsystem.		

	2 _{nd}	StandardTest signal.	
	3rd	TimeResponseoffirstordersystem with: 1. Unitstepresponse	
		2. Unitimpulseresponse	
	$4_{ m th}$	Timeresponseof secondordersystemtotheunitstepinput.	
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	5th	Typesofcontrolsystem.[SteadystateerrorsinType-0,Type-1,Type-2system	
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Oth	1 st	Typesorcontroisystem.[SteadystateenforsinType-0, Type-1, Type-2system	
	2nd	Effectofaddingpolesandzeroto transferfunction.	
		or	
	3rd	Effectofaddingpolesandzeroto transferfunction.	
	$4_{\rm th}$	7ResponsewithP,PI,PDandPIDcontroller.	
	5th	8ResponsewithP,PI,PDandPIDcontroller.	
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/th	l st	TECHNIQUE : Pootlogusconcept	
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	Znd	Roottocusconcept.	
	3rd	Rootlocusconcept.	
	4th	Constructionofrootioci.	
	5th	Constructionofrootloci.	
8th	1 _{st}	Rulesforconstructionoftherootlocus.	
8 _{th}	1 _{st}	Rulesforconstructionoftherootlocus.	
8th	1st	Rulesforconstruction of the root locus	
8th	lss 2nd	Rulesforconstructionoftherootlocus. Rulesforconstructionoftherootlocus.	
8th	lst 2nd	Rulesforconstructionoftherootlocus. Rulesforconstructionoftherootlocus.	
8 _{th}	1st 2nd 3rd	Rulesforconstructionoftherootlocus. Rulesforconstructionoftherootlocus. EffectofaddingpolesandzerostoG(s)and H(s).	
8th	Ist 2nd 3rd	Rulesforconstructionoftherootlocus. Rulesforconstructionoftherootlocus. EffectofaddingpolesandzerostoG(s)and H(s).	
8th	1st 2nd 3rd 4a	Rulesforconstruction of the root locus. Rulesforconstruction of the root locus. Effect of adding poles and zeros to G(s) and H(s). Effect of adding poles and zeros to G(s) and H(s).	
8th	1st 2nd 3rd 4th	Rulesforconstructionoftherootlocus. Rulesforconstructionoftherootlocus. EffectofaddingpolesandzerostoG(s)and H(s). EffectofaddingpolesandzerostoG(s)and H(s).	
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8th 9th	1st 2nd 3rd 4th 5th 1st 2nd 3rd	Rulesforconstruction of the root locus. Rulesforconstruction of the root locus. Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Correlation between time response and frequency response Correlation between time response and frequency response Correlation between time response and frequency response	
8th 9th	1st 2nd 3rd 4ch 5th 1st 2nd 3rd 4ch	Rulesforconstruction of the root locus. Rulesforconstruction of the root locus. Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Correlation between time response and frequency response Correlation between time response and frequency response Correlation between time response and frequency response Polar plots.	
8th 9th	1st 2nd 3rd 4th 5th 1st 2nd 3rd	Rulesforconstruction of the root locus. Rulesforconstruction of the root locus. Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Correlation between time response and frequency response Correlation between time response and frequency response Correlation between time response and frequency response Polarplots.	
8th 9th	1x 2nd 3rd 4th 5th 1x 2nd 3rd 4th 5th 1x 2nd 3rd 4th 5th	Rulesforconstruction of the root locus. Rulesforconstruction of the root locus. Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Correlation between time response and frequency response Correlation between time response and frequency response Correlation between time response and frequency response Polar plots. Bode plots.	
8th 9th	1st 2nd 3rd 4th 5th 1st 2nd 3rd 5th 5th 5th 5th 5th 5th 5th 5th	Rulesforconstruction of the root locus. Rulesforconstruction of the root locus. Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Correlation between time response and frequency response Correlation between time response and frequency response Correlation between time response and frequency response Polar plots. Bode plots.	
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8th 9th 10kh	1st 2nd 3rd 4th 5th 1st 2nd 3rd 4th 5th 1st 2nd 3rd 4th 5th 1st 2nd 3rd 1st 5th 1st	Rulesforconstruction of the root locus. Rulesforconstruction of the root locus. Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). PARTGFREOUENCYRESPONSE ANALYSIS.: Correlation between time response and frequency response Correlation between time response and frequency response Correlation between time response and frequency response Polarplots. Bode plots. All pass and minimum phase system.	
8th 9th 10th	1st 2nd 3rd 4th 5th 1st 2nd 3rd 1st 2nd 3rd 1st 1st 1st	Rulesforconstruction of the root locus. Rulesforconstruction of the root locus. Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Correlation between time response and frequency response Correlation between time response and frequency response Correlation between time response and frequency response Polar plots. Bode plots. All pass and minimum phasesystem. Computation of Gain margin and phase margin.	
8th 9th 10th	1st 2nd 3rd 4th 5th 1st 2nd 3rd 4th 5th 1st 2nd 3rd 4th 1st 1st 2nd	Rulesforconstruction of the root locus. Rulesforconstruction of the root locus. Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Correlation between time response and frequency response Correlation between time response and frequency response Correlation between time response and frequency response Polarplots. Bode plots. All pass and minimum phases ystem. Computation of Gain margin and phase margin.	
8th 9th 10th	1st 2nd 3rd 4th 5th 1st 2nd	Rulesforconstruction of the root locus. Rulesforconstruction of the root locus. Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Effect of adding poles and zerosto G(s) and H(s). Correlation between time response and frequency response Correlation between time response and frequency response Correlation between time response and frequency response Polarplots. Bode plots. All pass and minimum phasesystem. Computation of Gain margin and phase margin.	
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8th 9th 10th	1st 2nd 3rd 4ds 5th 1st 2nd 3rd 4ds 1st 2nd 3rd 4ds 2nd 3rd 4ds 3rd 3rd 3rd	Rulesforconstruction of the root locus. Rulesforconstruction of the root locus. Effect of adding poles and zerost oG (s) and H(s). Effect of adding poles and zerost oG (s) and H(s). Effect of adding poles and zerost oG (s) and H(s). Effect of adding poles and zerost oG (s) and H(s). Effect of adding poles and zerost oG (s) and H(s). Correlation between time response and frequency response Correlation between time response and frequency response Correlation between time response and frequency response Polarplots. Bode plots. All pass and minimum phases ystem. Computation of Gain margin and phase margin. Log magnitude versus phase plot.	
8th 9th 10th	1x 2nd 3rd 4th 5th 1x 2nd 3rd 4th 1x 2nd 3rd 4th 1x 2nd 3rd 4th 5th 1x 2nd 3rd 4x	Rulesforconstruction of the root locus. Rulesforconstruction of the root locus. Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Effect of adding poles and zerost oG(s) and H(s). Correlation between time response and frequency response Correlation between time response and frequency response Correlation between time response and frequency response Polarplots. Bode plots. All pass and minimum phases ystem. Computation of Gain margin and phase margin. Log magnitude versus phase plot.	
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	5th	Closedloopfrequencyresponse.	
11th	1 st	PARTHNYQUISTPLOT: Principleof argument	
	2nd	Principleofargument	
	3rd	Nyquiststabilitycriterion.	
	4 _{th}	Nyquiststabilitycriterion.	
	5th	Niquiststabilitycriterionappliedtoinversepolarplot	
12th	1 st	4 Effect of addition of poles and zeros to G(S)H(S) on the shape of Niquist plot to the state of the state	
	2nd	5 Effect of addition of poles and zeros to G(S)H(S) on the shape of Niquist plot to the state of the state	
	3rd	Assessmentofrelativestability.	
	4 _{th}	ConstantMandNcircle	
	5th	Nicholaschart.	
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