

H_∞ Gain-scheduled Controller Design for Rejection of Time-varying Narrow-band Disturbances Applied to a Benchmark Problem

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I. SIMULATION RESULTS

TABLE I
SIMULATION RESULTS - SIMPLE STEP TEST

LEVEL 1							
Frequency (Hz)	GA (dB)	DA (dB)	MA (dB@Hz)	N ² T ($\times 10^{-3}$)	N ² R ($\times 10^{-3}$)	MV ($\times 10^{-3}$)	TD (ratio)
50	30.1	22.1	9.7@53.1	13.5	6.0	19.2	1.04
55	33.1	39.1	5.8@114.1	11.2	4.2	21.6	1.08
60	32.9	40.7	5.3@78.1	9.2	4.4	21.5	1.09
65	33.2	39.3	5.4@73.4	8.0	4.3	19.5	1.08
70	33.6	47.4	4.6@51.6	8.0	4.2	22.7	1.08
75	34.3	42.9	3.7@50.0	8.1	3.9	22.5	1.07
80	34.8	45.3	3.9@50.0	8.0	3.6	21.3	1.08
85	34.5	43.2	4.0@50.0	8.6	3.7	23.4	1.10
90	32.3	39.4	4.5@50.0	12.6	3.9	25.5	1.09
95	24.0	23.8	5.0@50.0	15.6	4.5	29.9	1.09
LEVEL 2							
Frequency (Hz)	GA (dB)	DA (dB)-(dB)	MA (dB@Hz)	N ² T ($\times 10^{-3}$)	N ² R ($\times 10^{-3}$)	MV ($\times 10^{-3}$)	TD (ratio)
50-70	35.5	27.4 - 23.0	11.3@114.1	87.7	6.5	61.6	1.04
55-75	38.6	33.7 - 33.6	9.6@114.1	67.8	4.6	59.2	1.05
60-80	39.8	41.8 - 37.1	6.8@114.1	53.8	4.0	53.7	1.08
65-85	40.0	49.6 - 43.8	6.4@50.0	64.9	3.9	69.0	1.10
70-90	38.5	54.7 - 47.1	9.1@50.0	80.8	4.2	76.5	1.09
75-95	35.1	48.8 - 36.8	11.2@50.0	95.3	4.8	72.1	1.06

TABLE II
SIMULATION RESULTS - CHIRP TEST

Profile	Mean Square $\times 10^{-6}$		Maximum $\times 10^{-3}$	
	\nearrow	\searrow	\nearrow	\searrow
Level 1	3.4	3.8	6.3	6.4
Level 2	10.0	11.1	10.1	9.8

TABLE III
SIMULATION RESULTS - STEP FREQUENCY CHANGES TEST

	Frequency (Hz)	N ² T ($\times 10^{-3}$)	MV ($\times 10^{-3}$)
Level 1	Sequence - 1		
	60→70	7.9	20.8
	70→60	8.3	16.5
	60→50	10.2	13.5
	50→60	7.3	15.6
	Sequence - 2		
	75→85	7.3	13.9
	85→75	8.7	17.0
	75→65	7.7	17.1
	65→75	7.9	15.3
	Sequence - 3		
	85→95	8.4	20.3
	95→85	9.6	18.5
	85→75	7.3	17.1
	75→85	8.1	17.4
Level 2	Sequence - 1		
	[55-75]→[60-80]	10.1	22.8
	[60-80]→[55-75]	16.3	21.6
	[55-75]→[50-70]	20.1	18.7
	[50-70]→[55-75]	10.1	17.9
	Sequence - 2		
	[70-90]→[75-95]	11.6	18.1
	[75-95]→[70-90]	13.9	22.5
	[70-90]→[65-85]	12.0	23.2
	[65-85]→[70-90]	10.9	20.8