- Governing equations from engineering first principles.	+
Consider a series LC circuit with	+
Inductor L	+
Capactor C	\perp
No resistance (ideal lossless circuit)	_
Applying Kirchloff & Voltage Law (KVL)	
V, + V _c = 0	

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	DEKUT	
Write on both sides of the paper	· Question	Do not Write
- LC oscillator arout		in eithe margin
i		
1 2 3 3 3 1 1 X 1 X 1 X 1 X 1 X 1 X 1 X 1 X	a	
C	S L	
Substituting using v	oltage-current rolationships	
V= Ldi		
dt		
V _c = 9(t)	where q = charge on capacitor	
C		
· Co,		
Ldi + 9	= 0	
dt c		
But i(t) = dq		
dt		
So substituting	current gives	
1 d2 x	9=0	
dt2	C	
This gives the q	overning second-order differential ea	nation
dast &	1. g(t) = 0	
dt2	LC b	

2-	yetem characteristics from mathematical analysis.	
	ystem characteristics from mathematical analysis. Natural frequency, wo = 1	
	ALC	
	This gives a harmonic accillator with the equation	
	$dq + \omega_q^2 = 0$	
	dt ²	
A Description	General solution,	
	qt = A cos(wot) + B sin (wot)	
·	it = dg(t) = - A wo sin (wot) + B wo cos (wot)	
	dt .	