

Aidan Chin					
29-Nov	compute $i(t)$, $v(t)$, $p(t)$, and the final energy stored in the inductor (after a very, very				
ECE 202	long time)				
t initial (milliseconds)	t final (milliseconds)	V_0 (volts)	R (Ohms)	L (Millihenries)	
0	50	5	2	10	
t step	tau				
0.125	5				
		voltage across inductor	power absorbed by inductor	total energy stored in inductor after inf time	final energy stored in inductor
t (ms)	$e(-t/\tau)$	$i(t)$ (amps)	$v(t)$ (volts)	$p(t)$ (watts)	P Final (watts)
0	1	0	5	0	31.25
0.125	0.975309912	0.06172522	4.87654956	0.301006094	$i(t)$ when $t = \text{inf}$ (amps)
0.25	0.951229425	0.121926439	4.756147123	0.579900081	2.5
0.375	0.927743486	0.180641284	4.638717432	0.837943874	measured P Final (watts)
0.5	0.904837418	0.237906455	4.52418709	1.076333312	31.24394292
0.625	0.882496903	0.293757744	4.412484513	1.296201494	Percent Error check of P Final
0.75	0.860707976	0.348230059	4.303539882	1.498621947	1.94%
0.875	0.839457021	0.401357448	4.197285104	1.684611638	
1	0.818730753	0.453173117	4.093653765	1.855133838	
1.125	0.798516219	0.503709453	3.992581094	2.011100839	
1.25	0.778800783	0.552998042	3.894003915	2.153376542	
1.375	0.759572123	0.601069692	3.797860616	2.282778911	
1.5	0.740818221	0.647954448	3.704091103	2.400082307	

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45259					
ECE 202					
t initial (milliseconds)	t final (milliseconds)	V_0 (volts)	R (Ohms)	L (Millihenries)	
0	=10*B9	5	2	10	
t step	tau				
=B7/400	=E7/D7				
		voltage across inductor	power absorbed by inductor	total energy stored in inductor after inf time	final energy stored in inductor
t (ms)	e(-t/tau)	i(t) (amps)	v(t) (volts)	p(t) (watts)	P Final (watts)
=A7	=EXP(-A12/\$B\$9)	=((\$C\$7*(1-B12)))/\$D\$7	=\$C\$7*B12	=C12*D12	=0.5*E7*F14^2
=A12+\$A\$9	=EXP(-A13/\$B\$9)	=((\$C\$7*(1-B13)))/\$D\$7	=\$C\$7*B13	=C13*D13	i(t) when t = inf (amps)
=A13+\$A\$9	=EXP(-A14/\$B\$9)	=((\$C\$7*(1-B14)))/\$D\$7	=\$C\$7*B14	=C14*D14	=\$C\$7/\$D\$7
=A14+\$A\$9	=EXP(-A15/\$B\$9)	=((\$C\$7*(1-B15)))/\$D\$7	=\$C\$7*B15	=C15*D15	measured P Final (watts)
=A15+\$A\$9	=EXP(-A16/\$B\$9)	=((\$C\$7*(1-B16)))/\$D\$7	=\$C\$7*B16	=C16*D16	=0.5*E7*(SUM(E12:E412)/(B7/A9))*10
=A16+\$A\$9	=EXP(-A17/\$B\$9)	=((\$C\$7*(1-B17)))/\$D\$7	=\$C\$7*B17	=C17*D17	Percent Error check of P Final
=A17+\$A\$9	=EXP(-A18/\$B\$9)	=((\$C\$7*(1-B18)))/\$D\$7	=\$C\$7*B18	=C18*D18	=ABS((F12-F16)/F12)*100
=A18+\$A\$9	=EXP(-A19/\$B\$9)	=((\$C\$7*(1-B19)))/\$D\$7	=\$C\$7*B19	=C19*D19	
=A19+\$A\$9	=EXP(-A20/\$B\$9)	=((\$C\$7*(1-B20)))/\$D\$7	=\$C\$7*B20	=C20*D20	
=A20+\$A\$9	=EXP(-A21/\$B\$9)	=((\$C\$7*(1-B21)))/\$D\$7	=\$C\$7*B21	=C21*D21	
=A21+\$A\$9	=EXP(-A22/\$B\$9)	=((\$C\$7*(1-B22)))/\$D\$7	=\$C\$7*B22	=C22*D22	

ECE 202, Exercist E6: Current, Voltage and Power Absorbed
for a charging inductor ($V_0 = 5V$, $R = 2\text{ohm}$, $L = 10\text{mH}$)

