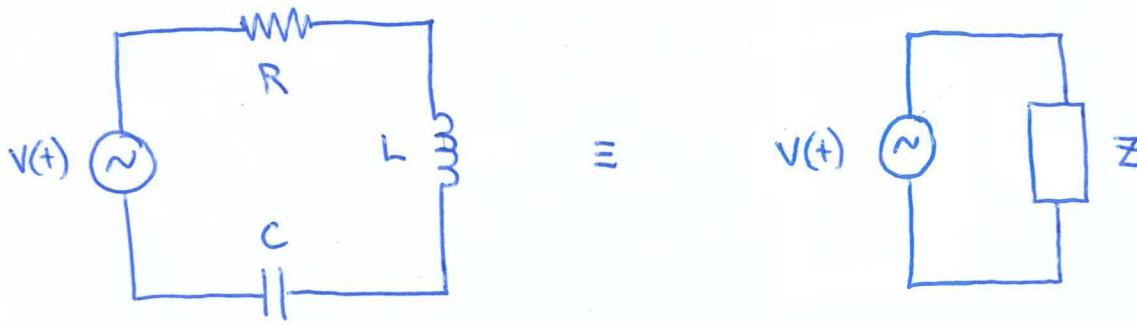


RLC Steady State



Phasors Ohm's Law:

$$\tilde{V} = Z \tilde{I} \quad \text{where} \quad Z = R + iX \quad \text{and} \quad X = \omega L - \frac{1}{\omega C}$$

Current Magnitude:

$$I_p = \frac{1}{|Z|} \quad \text{where} \quad |Z| = \sqrt{R^2 + X^2}$$

let $V_p = 1$

Current Phase Shift:

$$\phi_I = -\phi_Z \quad \text{where} \quad \phi_Z = \tan^{-1}\left(\frac{X}{R}\right)$$

let $\phi_V = 0$

Resonance:

$$X = 0 = \omega L - \frac{1}{\omega C}$$

$$\omega L = \frac{1}{\omega C}$$

$$\omega^2 L = \frac{1}{C}$$

$$\omega^2 = \frac{1}{LC}$$

$$\omega_0 = \frac{1}{\sqrt{LC}}$$

R series L series C Steady State Numerical Solution

Variables
R 50 ohm
L 0.1 Henry = ohm s
C 0.00001 Farad = s / ohm

Voltage Source
phi_V 0 degrees

Resonance
omega_o = 1000 rads/s
freq_o = 159.2 Hz

$$\text{dB} = 20 \log(I_p)$$

Steady-State Solution

omega order	omega [rads/s]	frequency [Hz]	X [ohms]	Z [ohms]	phi_Z [rads]	I_p [amps]	I_p [dB]	phi_I [degrees]
0.0000	1.0000	0.15915	-100000	100000	-1.57030	0.000010	-100.000	89.971
0.0100	1.0233	0.16286	-97724	97724	-1.57028	0.000010	-99.800	89.971
0.0200	1.0471	0.16666	-95499	95499	-1.57027	0.000010	-99.600	89.970
0.0300	1.0715	0.17054	-93325	93325	-1.57026	0.000011	-99.400	89.969
0.0400	1.0965	0.17451	-91201	91201	-1.57025	0.000011	-99.200	89.969
0.0500	1.1220	0.17857	-89125	89125	-1.57024	0.000011	-99.000	89.968
0.0600	1.1482	0.18273	-87096	87096	-1.57022	0.000011	-98.800	89.967
0.0700	1.1749	0.18699	-85114	85114	-1.57021	0.000012	-98.600	89.966
0.0800	1.2023	0.19135	-83176	83176	-1.57020	0.000012	-98.400	89.966
0.0900	1.2303	0.19580	-81283	81283	-1.57018	0.000012	-98.200	89.965
0.1000	1.2589	0.20036	-79433	79433	-1.57017	0.000013	-98.000	89.964
0.1100	1.2882	0.20503	-77625	77625	-1.57015	0.000013	-97.800	89.963
0.1200	1.3183	0.20981	-75858	75858	-1.57014	0.000013	-97.600	89.962
0.1300	1.3490	0.21469	-74131	74131	-1.57012	0.000013	-97.400	89.961
0.1400	1.3804	0.21969	-72443	72443	-1.57011	0.000014	-97.200	89.960
0.1500	1.4125	0.22481	-70794	70794	-1.57009	0.000014	-97.000	89.960
0.1600	1.4454	0.23005	-69183	69183	-1.57007	0.000014	-96.800	89.959
0.1700	1.4791	0.23541	-67608	67608	-1.57006	0.000015	-96.600	89.958
0.1800	1.5136	0.24089	-66069	66069	-1.57004	0.000015	-96.400	89.957
0.1900	1.5488	0.24650	-64565	64565	-1.57002	0.000015	-96.200	89.956
0.2000	1.5849	0.25224	-63096	63096	-1.57000	0.000016	-96.000	89.955
0.2100	1.6218	0.25812	-61659	61659	-1.56999	0.000016	-95.800	89.954
0.2200	1.6596	0.26413	-60256	60256	-1.56997	0.000017	-95.600	89.952
0.2300	1.6982	0.27028	-58884	58884	-1.56995	0.000017	-95.400	89.951
0.2400	1.7378	0.27658	-57544	57544	-1.56993	0.000017	-95.200	89.950
0.2500	1.7783	0.28302	-56234	56234	-1.56991	0.000018	-95.000	89.949
0.2600	1.8197	0.28961	-54954	54954	-1.56989	0.000018	-94.800	89.948
0.2700	1.8621	0.29636	-53703	53703	-1.56987	0.000019	-94.600	89.947
0.2800	1.9055	0.30326	-52481	52481	-1.56984	0.000019	-94.400	89.945
0.2900	1.9498	0.31033	-51286	51286	-1.56982	0.000019	-94.200	89.944
0.3000	1.9953	0.31756	-50119	50119	-1.56980	0.000020	-94.000	89.943
0.3100	2.0417	0.32495	-48978	48978	-1.56978	0.000020	-93.800	89.942
0.3200	2.0893	0.33252	-47863	47863	-1.56975	0.000021	-93.600	89.940
0.3300	2.1380	0.34027	-46773	46773	-1.56973	0.000021	-93.400	89.939
0.3400	2.1878	0.34819	-45709	45709	-1.56970	0.000022	-93.200	89.937
0.3500	2.2387	0.35630	-44668	44668	-1.56968	0.000022	-93.000	89.936
0.3600	2.2909	0.36460	-43651	43651	-1.56965	0.000023	-92.800	89.934
0.3700	2.3442	0.37310	-42658	42658	-1.56962	0.000023	-92.600	89.933
0.3800	2.3988	0.38179	-41687	41687	-1.56960	0.000024	-92.400	89.931
0.3900	2.4547	0.39068	-40738	40738	-1.56957	0.000025	-92.200	89.930
0.4000	2.5119	0.39978	-39810	39810	-1.56954	0.000025	-92.000	89.928
0.4100	2.5704	0.40909	-38904	38904	-1.56951	0.000026	-91.800	89.926
0.4200	2.6303	0.41862	-38019	38019	-1.56948	0.000026	-91.600	89.925
0.4300	2.6915	0.42837	-37153	37153	-1.56945	0.000027	-91.400	89.923
0.4400	2.7542	0.43835	-36308	36308	-1.56942	0.000028	-91.200	89.921
0.4500	2.8184	0.44856	-35481	35481	-1.56939	0.000028	-91.000	89.919

