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MATRIC NO: 17(ENG04/075) DEPT: ELECT/E100

Solution

① Command window

clear

clc

format short

V = 0.5

m = 3.5

q = 9.8

f = m * q

V = sqrt([([f + 0.02 * V]) * (log cv)^3] + [10 * V] + 17150/13);

for i = 1:m

iter(i+1) = i

V(i+1) = sqrt([([f + 0.02 * V(i)]) * (log cv)^3] + [10 * V(i)] + 17150/13);

Ea(i+1) = abs([V(i+1) - V(i)] / V(i+1) * 1000)

if Ea(i+1) <= 1e-4

break

end

end

base = table(iter, V, Ea)

OUTPUT

iter	V	Ea
0	0.5	0
1	239.05	99.791
2	294.17	18.736
3	302.61	2.7894
4	303.85	0.40992
5	304.04	0.060144

iter	V	E_n
6	304.06	0.0088222
7	304.07	0.0012941
8	304.07	0.00018981
9	304.07	$2.7842 e^{-05}$
10	304.07	$4.0838 e^{-06}$
11	304.07	$8.7865 e^{-08}$
12	304.07	$1.288 e^{-08}$
13	304.07	$1.8904 e^{-09}$
14	304.07	$2.7727 e^{-10}$
15	304.07	$4.0679 e^{-11}$
16	304.07	$5.9633 e^{-12}$

Converting OR iter $V = 304.07$

Power

$$P_D = \frac{0.3V^2}{500 (\ln V)^3} \quad 0.02V$$

If $V = 304.07$

Recall, $P_D = 9.8 \times 8.5 = 34.30$

Substituting $V = 304.07$

$$P_D = \frac{0.3 \times (304.07)^2}{500 + (\ln 304.07)^3} - 0.02(304.07)$$

$$P_D = 40.3819531 - 6.0814$$

$$P_D = 34.3 \text{ //}$$