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17/ENG04/012

ELECTRICAL / ELECTRONICS ENGINEERING

Eng 382

Matlab Code

Command window

clear

clc

format long g

V=0.5

for n=1:100

iter(0)=1;

$$V(i+1) = \sqrt[3]{\frac{34.5 + (0.2V^4)}{(2.1) / (0.8)}}$$

$$\epsilon(i+1) = \frac{\text{abs}(V(i+1) - V(i))}{V(i+1)} * 100;$$

if $\epsilon(i+1) <= 1e-11$

break

end

end

[iter 'v' ea]

Plot [v, iter]

axis tight

grid on

grid max

iter	V	ea
0	0.5	0
1	239.25	99.791
2	294.17	18.736
3	302.16	2.7895
4	303.85	0.409985
5	304.04	0.060153
6	304.06	0.0088241
7	304.07	0.0012944
8	304.07	0.0002944

$$9 \mid 304.07 \mid 0.9635 \times 10^{-12}$$

Converging at iter = 7, just $V = 304.07$

\therefore the converging value is seen to be 304.07.

Proofing

$$T_d = \frac{0.3V^2}{50 + (10V)^3} - 0.2V$$

If $V = 304.07$

$$\therefore T_b = 9.8 \times 3.8 = 34.3$$

$$= 0.3 \times (304.07)^2 - 0.2(304.07)$$

$$= 50 + (10 \times 304.07)^3$$

$$= 34.25$$

$$= 34.3$$