

ECSE597/ECSE472

Assignment #4

Question I

Write a matlab function dcsolvealpha.m that finds the dc solution of the augmented system:

$$GX + f(X) = \alpha B_{dc}$$

The functions is defined as follows:

```
function Xdc = dcsolvealpha(Xguess,alpha,maxerr)
% Compute dc solution using newtwon iteration for the augmented system
% G*X + f(X) = alpha*b
% Inputs:
% Xguess is the initial guess for Newton Iteration
% alpha is a paramter (see definition in augmented system above)
% maxerr defined the stopping criterion from newton iteration: Stop the
% iteration when norm(deltaX)<maxerr
% Oupputs:
% Xdc is a vector containing the solution of the augmented system
```

Deliverables:

1. Submit the matlab file dcsolvealpha.m containing your function
2. Include the code above in your PDF file submission for the assignment.

Question II

1. Write a matlab function dcsolvecont.m that finds the dc solution using the power ramping continuation method. Hint: It may be convenient for you to use the function you developed in Question I. The dcsolvecont.m function is defined as follows:

```
function Xdc = dcsolvecont(n_steps,maxerr)
% Compute dc solution using newtwon iteration and continuation method
% (power ramping approach)
% inputs:
% n_steps is the number of continuation steps between zero and one that are
% to be taken. For the purposes of this assignments the steps should be
% linearly spaced (the matlab function "linspace" may be useful).
% maxerr is the stopping criterion for newton iteration (stop iteration
% when norm(deltaX)<maxerr)
```

2. Test this function by finding the dc solution (at node Vo) of the following diode circuit at three different values of Vi (-10V, -2V, and 8V). Use 10 continuation steps in this test. Note, we provide the netlist for this circuit in the file Sedra4_93.m. All diodes in this circuit have Is=2e-15A and Vt=26e-3V.
3. Run the provided script: TestBenchDiodeckt4_93.m. This script will use your dcsolvecont function in order to compute and plot Vo as a function of Vi.

Deliverables

1. The matlab function dcsolvecont.m
2. A pdf file containing the matlab function dcsolvecont.m. The solutions found in part 2, and the plot provided by the script in part 3.

