EE 42 – Introduction to Electronics for Computer Science Fall 2003, <u>Prof. A. R. Neurer</u>



Fall 2003,Prof. A. R. NeureutherDept. EECS, 510 Coryneureuth@eecs.berkeley.edu642-4590UC BerkeleyOffice Hours M1, Tu, Th 10:30-11:30, F 11Course Web Sitehttp://www-inst.eecs.berkeley.edu/~ee42/

Problem Set # 4 Due:1 PM Sep 24th, 2003 in box outside <u>240</u> Cory

Announcements:

Quiz in class 9/25 for 20 minutes on Basic Circuit Analysis and Basic Transients. Midterm in class 10/2 covers lectures 1-9, closed book, closed notes, bring calculator, paper provided. Reading Week #4: Schwarz and Oldham 8.1 and RC_Handout; 53-58; 2.5-2.6. Review Sessions for Midterm: TBA

4.1 Transient



Assume that the 5pF capacitor has been uncharged for a very long time until t = 0. a) Find $v_C(t)$ for $t \ge 0$.

b) Find the energy stored on the capacitor as time goes to infinity.

4.2 Transient Analysis Cont.



- a) Draw the equivalent Thevenin circuit with respect to V_{OUT} . Compute V_{TH} and R_{TH} .
- b) Suppose at time t = 0, an uncharged capacitor (2pF) is attached to V_{OUT} of the circuit found in part a.
- Determine $v_c(t)$, which is the voltage across the capacitor for $t \ge 0$.
- c) Determine $i_R(t)$ for t > 0.
- d) Compute the total energy absorbed by the capacitor.

4.3 Nodal Analysis



a) Write nodal equations at each unknown node, excluding the ground node. b) Solve for $V_{\rm A}$ and $V_{\rm B}$

4.4 Nodal Analysis Cont.



- a) Identify a convenient place to put the ground node.
- b) Label the unknown voltage nodes, excluding the ground node.
- c) Write nodal equations at each node. Solve for all the unknown voltage nodes.