Exam Version D

For Students with Last Digit of Student ID 6 or 7

Circuit and System Analysis

2020-2021 SPRING SEMESTER FINAL EXAM

- Students will solve the final exam version corresponding to their last digit of their ITU Student ID Number as explained below:
  - last digit of Student ID Number **0** or **1** will solve Exam Version A
  - last digit of Student ID Number **2** or **3** will solve Exam Version B
  - last digit of Student ID Number **4** or **5** will solve Exam Version C
  - last digit of Student ID Number **6** or **7** will solve Exam Version D
  - last digit of Student ID Number **8** or **9** will solve Exam Version E

  Submitted solutions corresponding to wrong exam version based on the last digit of Student ID Number will receive 0 credit.
- The exam is open-book and open-lecture notes. Exams are exclusive to students and they are expected to work on the solutions on their own. Students are expected to abide with the ITU Honor Code

  http://www.sis.itu.edu.tr/tr/yonetmelik/AkademikOnurSozuEsaslar.html
- Solutions in PDF format are required to be uploaded to the Ninova system before the exam ended. There won't be extra time for uploading the solutions.
- Each page of the solution has to be numbered and should have name, last name and Student ID number on top right corner.
- There will be a zoom session at the beginning of the exam for announcements and questions about the exam.
- By uploading the solutions, students here confirm that they have understood the instructions and will act accordingly.
- All questions have equal points.

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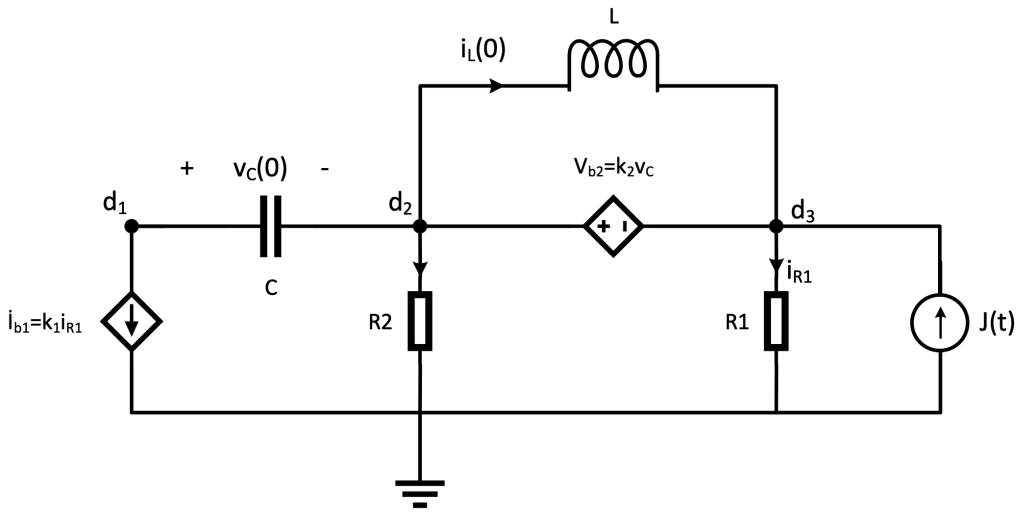
Final Exam

1. (a) Write the modified (generalized) node equations considering the initial conditions in s-domain for the circuit given below. (b) Express the equations in the matrix form.



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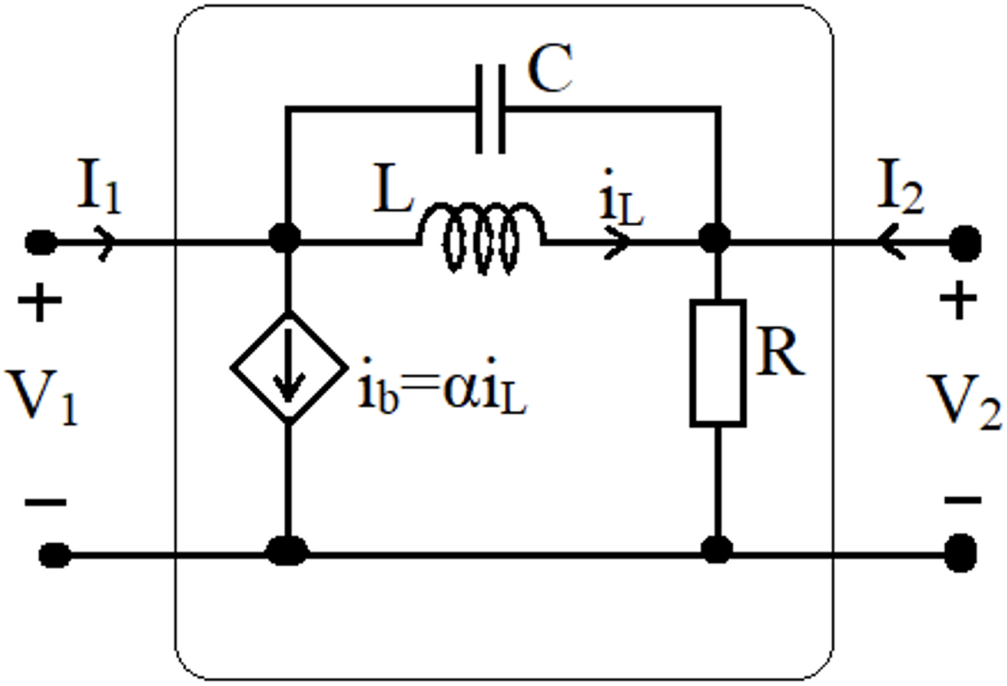
2. Find the y-parameters for the 2-port network shown in Figure.



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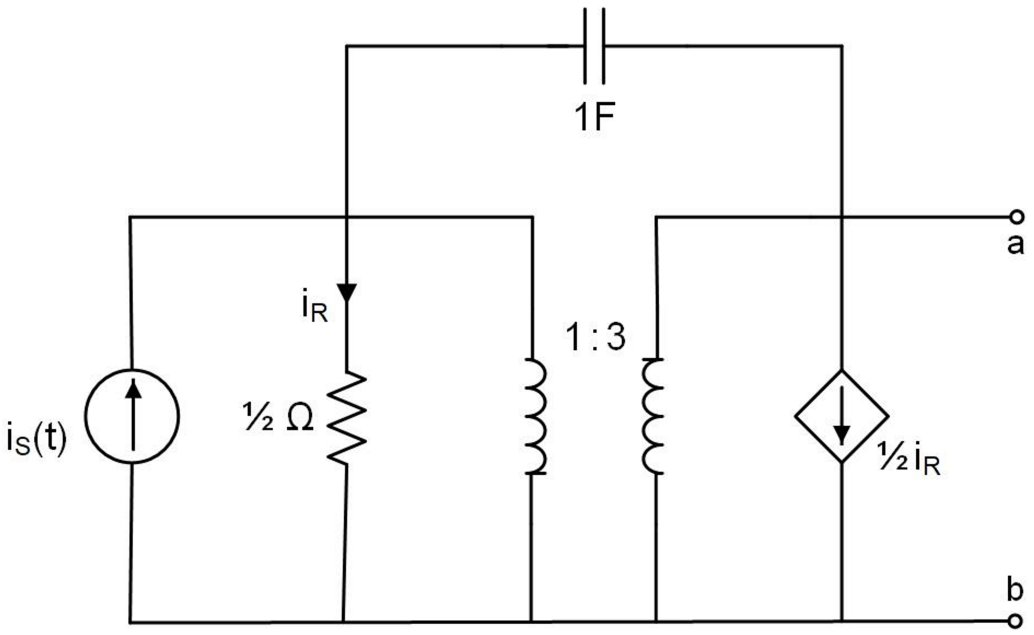
3. In order to transfer maximum power, what should be the value of the load connected to port a-b ($i_s(t) = \sqrt{2}\cos(2t + \frac{5\pi}{4})$) ?



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4. For the block diagram below, (a) find the transfer function $\frac{Y(s)}{X_1(s)}$ for $X_2(s) = \frac{1}{s}X_1(s)$ (b) Comment on the stability of the system.