



الرقم:

الاسم:

Digital Control
1st 2019- 2020
2nd Exam

Answer all questions
Time: 50 minutes
Dr. Jasim Ghaeb

Q1: (8-marks). The characteristic equation of a digital control system is given below:

$$(0.152 + 0.0076k)W^2 + (18.24 - 0.00828k)W + 301.6 + 0.00064k = 0$$

Use Routh- Hurwitz to determine:

1-) the range of "k" for system stability. 2-) the value of "k" for marginal system stability

Q2: (8-marks). For the digital control system of: $kG(z) = \frac{0.35k (z + 0.69)}{(z - 1) (z - 0.37)}$

- a-) determine the number of asymptotes.
- b-) find the angle of asymptotes.
- c-) d-) draw approximate root locus in the z-plane.

Q3: (4-marks). Figure.1 and Figure.2 show the T_s -counters in s-plane. Use Cauchy's theorem to draw the approximate T_q - counter for each T_s counter.

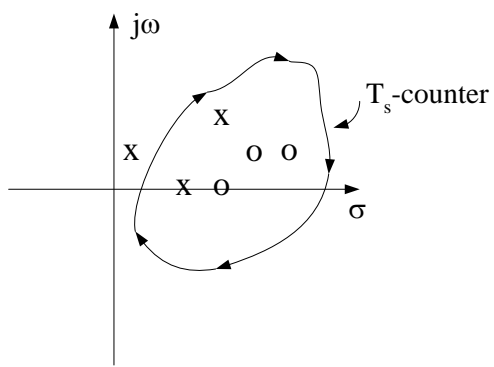


Figure.1

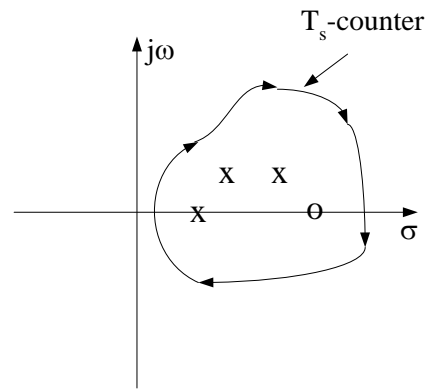


Figure.2