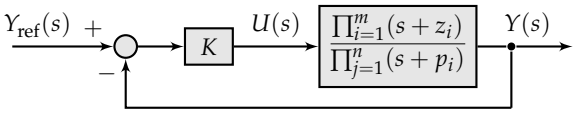
Student's Name: **Roll No.:**

Quiz # 3 EE 250 (Control System Analysis) Spring 2011 *

DEPARTMENT OF ELECTRICAL ENGINEERING, IIT KANPUR.

The negative root locus (NRL) is the locus of the poles of the system



with $n \geq m$, and $K \in [0, -\infty)$. In this quiz, we will become acquainted with the NRL.

1. **[1 points]** Write the phase condition for the NRL.

2. **[2 points]** Assume that $n > m$. Derive a simple expression for the centroid of the asymptotes of this NRL in terms of p_i, z_i, n, and m.

3. **[2 points]** The OL TF is second order with $-1 \pm j4$ as zeros and with two poles at 0. Determine the angle of arrival of the NRL at $-1 + j4$.

*Instructor: Ramprasad Potluri, E-mail: potluri@iitk.ac.in, Office: WL217A, Lab: WL217B, Phones: (0512) 259-8837, 259-7735.