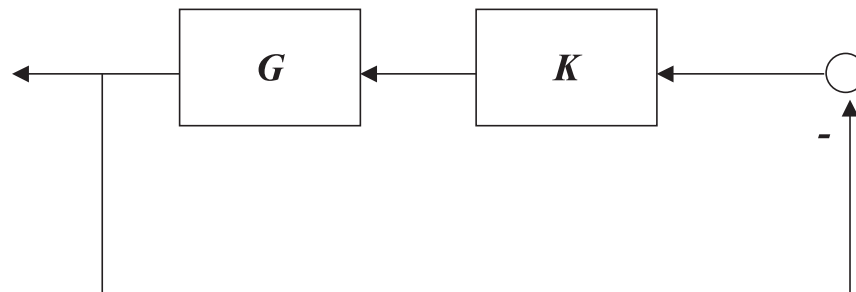


Homework # 5

Due: 11/2/2006

1. (40%) Consider the following control system with

$$G(s) = \frac{1}{s+1} \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$



Suppose $K = \text{diag}\{k_1, k_2\}$, k_i is real. Find the region in (k_1, k_2) space (\mathbf{R}^2) that guarantees closed loop stability using the following methods

- (a) Small Gain Theorem
 - (b) Positive Realness Theorem
 - (c) Linear Matrix Inequality
 - (d) Real and complex structured singular value (μ)
 - (e) Kharitonov's Theorem
2. (15%) 8.1
 3. (15%) 8.3
 4. (15%) 9.1 (3 and 5)
 5. (15%) 9.3