EE 7725 **Homework 6** **Due: 6 December 1996**

Problem 1: A property of groups is that they are closed, that is, applying the operation to two elements in a group yields an element in the group. Show that this is true for the set of upper-triangular permutations. That is, show that if $P \in \Upsilon$ and $Q \in \Upsilon$ and if $R = PQ$, then $R \in \Upsilon$. (In the answer do not refer to the fact that they are groups.)

Problem 2: Define sets of permutations for the baseline network analogous to the upper- and lower-triangular permutations for the omega network. As for the corresponding permutations in the omega network, with baseline upper-triangular permutations cell settings should be based on the forward-path descriptor; with baseline lower-triangular permutations cell settings should be based on the reverse-path descriptor.

Problem 3: Let $\Upsilon_{m,n,B}$ denote the set of all baseline-network upper-triangular permutations defined above. Show that there is not an inverse for every element in $\Upsilon_{m,n,B}$. That is—unlike in the omega network—there exists $P \in \Upsilon_{m,n,B}$ such that $P^{-1} \notin \Upsilon_{m,n,B}$.