ELEG 667-010 - Advanced Nanostructure Devices – Fall 2006
Homework #6 - due Monday, 6 November 2006, in class

1. Problem 4.22, in chapter 4, Lundstrom, p. 210 in 2nd edition. Hint: Use the approach of Eq. (4.115) to calculate the potential difference V(+,-) = V(A) – V(B), as shown in the Fig. P4.1. Assume a spacing, s, between each of the four contacts. Calculate the V(+,-) = V(A) – V(B) due to the current injected in the leftmost contact, and then calculate the voltage V(A') – V(B') due to the current laving the rightmost contact. Form your result from the sum of these two voltages.

2. Problem 5.1, in chapter 5, Lundstrom, p. 243 in 2nd edition. Hint: Do in 1 dimension and assume that f $\rightarrow$ 0 exponentially as the integration limits L $\rightarrow \infty$.

3. Problem 5.5, (P5.1) and (P5.3) only, in chapter 5, Lundstrom, p. 243 in 2nd edition. Hint: First Hint: Recast Eq. (5.32) for J_{nz} in steady state and use $\mu_n = q/m^*\langle\langle 1/\tau_m \rangle\rangle$ is a constant. Assume W_{ij} is diagonal with $W_{zz} = nk_BT_e/2$. Second Hint: From Eq. (5.37) in steady state, form $J_{nz}\mathcal{E}_z$, and assume $S_E = 0$. Define $(W-W^o)\langle\langle 1/\tau_E \rangle\rangle = nB(T_e)$ and $F_{Wz} = S(T_e)$.

4. Problem 5.10, in chapter 5, Lundstrom, p. 243 in 2nd edition. Hint: Justify by the even/ odd symmetry of the summed factors.

Homework assignments will appear on the web at:
http://www.ece.udel.edu/~kolodzey/courses/eleg667f06.html
Note: On each homework and report submission, please give your name, the due date, assignment number and the course number. For full credit - include units/dimensions for all numerical quantities