ECE 330 HW 7

Textbook problem 4.8

Textbook problem 4.9

Textbook problem 4.12

Textbook problem 4.14 (Partial answer: i=5, x=0 (+1, -1))

Textbook problem 4.19

Special Problem #1
A single-phase rotating machine has one coil on the stator with current i_s and one coil on the rotor with current i_r. The inductances for this machine are (assume linear magnetic core):
$L_{ss} = L_s$, $L_{sr} = M\cos(\theta)$, $L_{rs} = M\cos(\theta)$ and $L_{rr} = L_r$.

The machine is being operated such that the currents i_s and i_r can be assumed to be constants at I_s and I_r respectively while the shaft is rotated from with $\theta = 0$ to $\theta = \frac{\pi}{2}$. For this change from "point a" to "point b":

1. Find the energy transferred from the mechanical system into the coupling field as the system moved from point a to point b with constant currents.

2. Find the energy transferred from the electrical system into the coupling field as the system moved from point a to point b with constant current.