

## ECE 320: Lecture 36

### Notes

#### *Exam 2*

Average 90.5%

|         |    |         |
|---------|----|---------|
| 90-100: | 21 | Max 100 |
| 80-89:  | 7  |         |
| 70-79:  | 2  |         |
| 60-69:  | 1  |         |

#### *Four Common Classes of Configurations:*

1. Buck Converter (or down converter). The output voltage is less than or equal to the input voltage. Common in switch mode power supplies. We have discussed this partially already

$$\frac{V_{oAVE}}{V_d} = D \qquad \frac{I_{oAVE}}{I_d} = \frac{1}{D}$$

2. Boost Converter (up converter). The output voltage larger than the input voltage. The inductor current is on the input, and it is pumped up with the switch. See Fig 7-11

Ideal, steady-state continuous conduction:

$$\frac{V_{oAVE}}{V_d} = \frac{1}{1 - D} \qquad \frac{I_{oAVE}}{I_d} = 1 - D$$

3. Buck-Boost Converter (up/down converter). The output voltage can be smaller or larger than the input voltage. The inductor current is now an intermediate stage. See Fig 7-18

Ideal, steady-state continuous conduction:

$$\frac{V_{oAVE}}{V_d} = \frac{D}{1 - D} \qquad \frac{I_{oAVE}}{I_d} = \frac{(1 - D)}{D}$$

Polarity of the voltage and the current is reversed from the other two topologies.

3a. A variation on buck/boost is the Cuk converter. Same transfer input/output equations, but topo differs, see Figure 7-25. Another is the Sepic converter. We probably won't cover these in detail.