1. (a) Please describe the operating principles for a buck-boost converter shown in Figure 1. (10%)
   (b) Derive an expression for output-voltage ripple ΔV_o in CCM mode in terms of the circuit parameters. (5%)
   (c) Please derive the load current condition at the boundary of CCM and DCM operations. (5%)

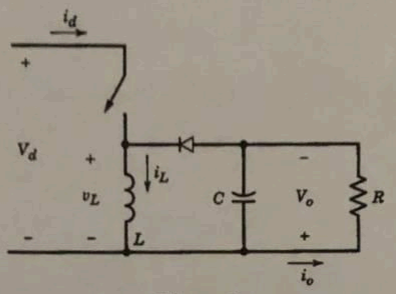


Figure 1

2. What is the principle of series-loaded resonant DC/DC converters? Please describe the advantages and limitations of them. (20%)

3. What is the principle of ZCS resonant-switch converters? (10%)

4. Please describe the principle for the DCM Flyback converter and list the advantages and limitations of the topology circuit. (10%)

5. Please describe the operation principles of the PWM with unipolar voltage switching for the full-bridge inverter shown in Figure 2. (20%)

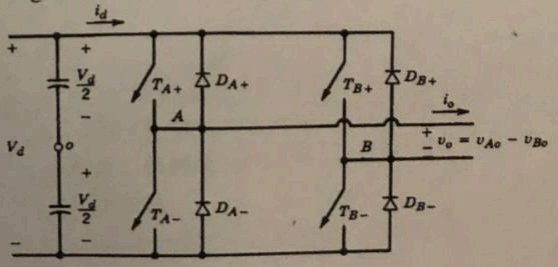


Figure 2

6. Please describe the operating principles for the half-bridge DC-DC converter and compare with the push-pull topology. (20%)

1. Please depict and explain the block diagram of an AC motor driver. (20%)

2. What are the differences in the power capability and switching speed of various controllable switches? (10%)

3. Please depict and explain an equivalent circuit of a transformer including the effect of core losses. (20%)

4. Please describe different types of computer simulation for power electronic converters and systems. (20%)

5. Please describe the operating principle of a voltage-doubler circuit shown in Figure 1. (20%)

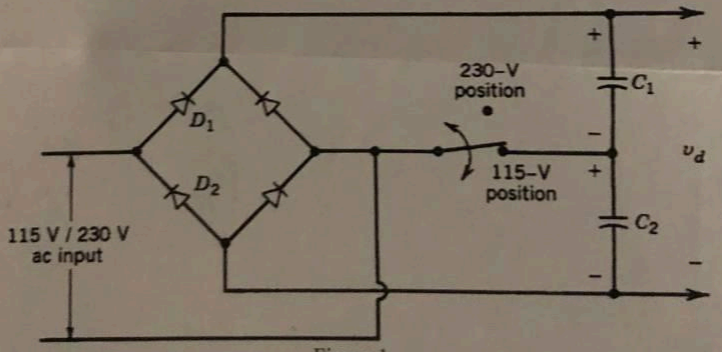


Figure 1

6. Please depict and explain a thyristor gate trigger control circuit. (10%)

PG-11 、PG-9

1. What is the principle of series-loaded resonant DC/DC converters? Please describe the advantages and limitations of them. (20%)

9-11

2. What is the principle of ZCS resonant-switch converters? (20%)

9-29

3. Please describe the operating principles for the DCM Flyback converter and list the advantages and limitations of the topology circuit. (20%)

9-8

10-10

4. Please describe the operating principles for the half-bridge DC-DC converter and compare with the push-pull topology. (20%)

10-18

10-20

5. Please describe the principles of class E converters and list the advantages and limitations of them. (20%)

9-25

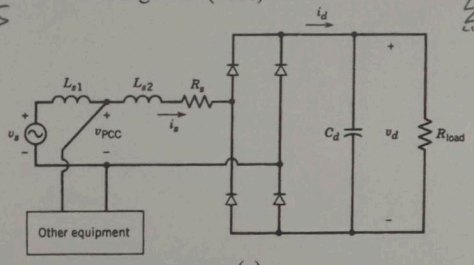
交流馬達驅動方塊

1. Please depict and explain the block diagram of an AC motor driver. (20%)

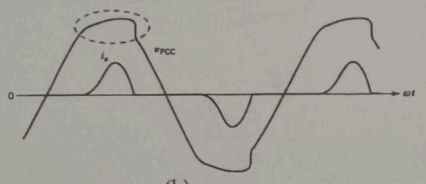
2. Please explain the line-voltage distortion problem at the point of common coupling (PCC) in the circuit of Figure 1. (20%)

5-25

線電壓失真



(a)



(b)

Figure 1

3. What are the differences in the power capability and switching speed of various controllable switches? (20%)

可控閘 功率容量 切換速度

4. Please depict and explain an equivalent circuit of a transformer including the effect of core losses. (10%)

包含 core loss 等效電路

5. Please describe different types of computer simulation for power electronic converters and systems. (20%)

6. Please depict and explain a thyristor gate trigger control circuit. (10%)

驅動控制電路