1. **~~Introduction~~**
2. **Buck Converter의 이해**
3. ~~MOSFET의 스위칭과 Diode의 역할~~
4. ~~BuckConverter에서 Inductor의 원리 및 역할, 이상적인 입출력 전압 관계 유도~~
5. ~~BuckConverter에서 Capacitor의 원리 및 역할~~
6. ~~LC lowpassfilter의 원리 및 역할~~
7. ~~MOSFET의 스위칭에 의한(on, off) 컨버터 출력~~
8. ~~Bootstrap의 필요성 (이상적이지 않은 Buck Converter 출력)~~
9. ~~Bootstrap의 원리~~
10. **Discussion**

problems

1. **Result**

데이터 값 figure 정리

Experimental 답변

1. **Observation**

실험하면서 오차값 원인 파악 (bootstrap을 썼을 때 Duty값을 높혔을 때 생기는 오차)

1. **CONCLUSION**
2. **WORK DISTRIBUTION**
3. **APPENDIX**

**Problems**

1. ) Draw waveforms of diode voltage, MOSFET current & voltage, inductor current & voltage, capacitor current & voltage and load current. Use time units like T, D, etc……
2. If the current waveform in steady state in an inductor of 50μH is as shown in Fig. 14, Draw a waveform of the inductor voltage waveform vL(t).

차트, 도표이(가) 표시된 사진

자동 생성된 설명

1. The capacitor current iC, shown in Fig. 15, is flowing through a capacitor of 100 μF. Calculate the peak-peak ripple in the capacitor voltage waveform due to this ripple current.

도표이(가) 표시된 사진

자동 생성된 설명

1. From the PSIM Circuit of the Buck converter shown in Fig. 2, Inductor, L = 24 μH. It is operating in dc steady state under the following conditions: Vin =20 V, D = 0.6, Pout = 14 W, and f = 200 kHz. Assuming ideal components, calculate and draw the waveforms of the inductor current and voltage.
2. In a Buck dc-dc converter, L = 25 μH. It is operating in dc steady state under the following conditions: Vin = 42 V, D = 0.3, and f = 400 kHz. Assume ideal components. The output load is changing. Calculate the critical value of the output load RLoad and Pout below which the converter will enter the discontinuous conduction mode of operation.
3. A Buck dc-dc converter is to be designed for Vin = 20 V, Vout = 12 V, and the maximum output power Pout = 72 W. The switching frequency is selected to be f = 400 kHz. Assume ideal components. Estimate the value of the filter inductance that should be used if the converter is to remain in CCM at one-third the maximum output power.
4. Experiment

※ Be careful, Some components in the circuit can get hot.

1) Following values are given: f = 150[kHz], RLoad = 20[Ω], Vin = 12[V], Pout,max = 10[W], L = 150[μH], C = 1,800[μF], ΔVout ≤ 0.1%∙Vout. Find if these values will be suitable of the Buck converter design before further procedure.

2) One must create the Buck converter circuit and have a clear picture of the circuit.

3) One must show duty – output voltage curve when input voltage is set to 12[V] and Switching frequency is set to 150[kHz].

4) One must apply a Bootstrap to the Buck converter and have a clear picture of the circuit.

5) One must show duty – output voltage curve when input voltage is set to 12[V] and Switching frequency is set to 150[kHz] with a Bootstrap on. Then compare it with the curve without a Bootstrap.