Final Projects

Course

Electronic Circuit Design Technology (ECDT)

Marking criteria:

Total marks are 100

Each Project has three parts:

- **Part (i) has 20 marks**
- **Part (ii) has 35 marks**
- **Part (iii) has 45 marks**

Project # 1

Group members:

潘盈盈 Pan Yingying 2019329600060

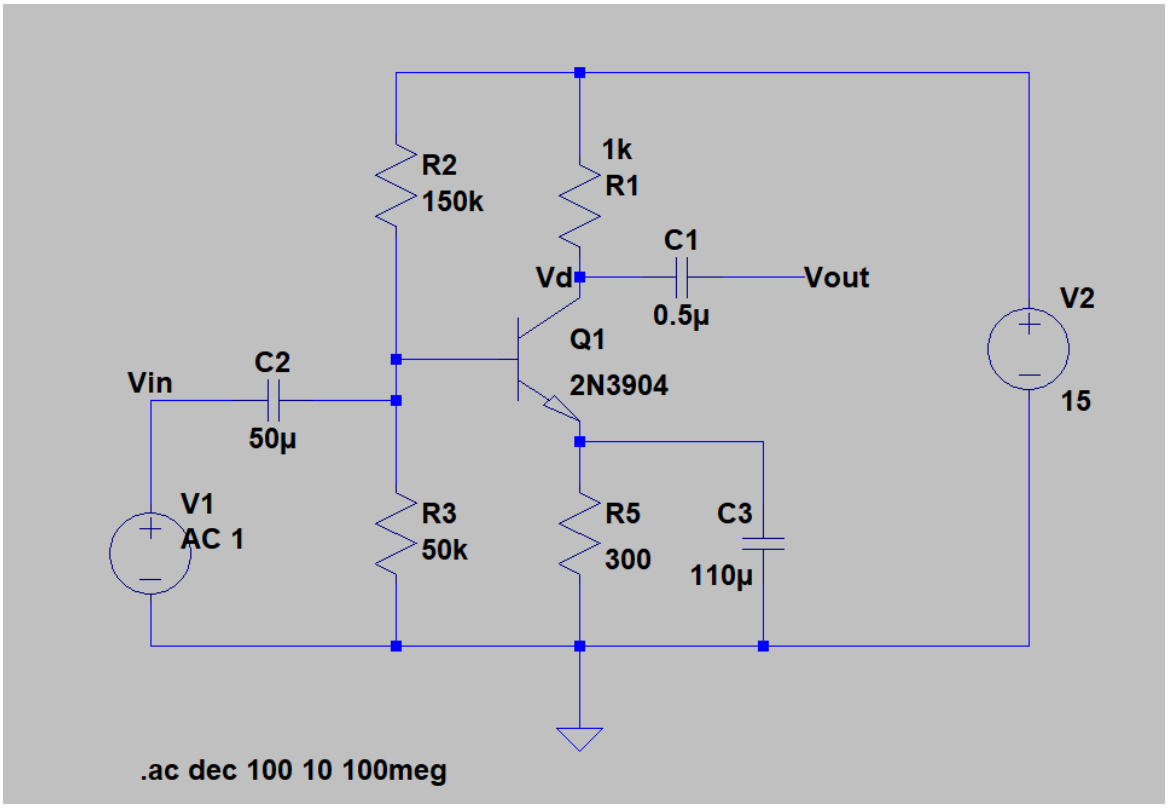
张紫怡 Zhang Ziyi 2019329600091

王茜 Wang Xi 2019329600090

i. **Do the** Mathematical Analysis i.e. DC and Small signal analysis of the amplifier shown in figure and find the voltage gain (Reference class lecture #1)

ii. Simulate the circuit in LTSpice and plot the Gain in dB and Linear scale, find the 3db bandwidth (Reference class lecture #1)

iii. Design the PCB of the amplifier using Altium Designer



Submit a report to the teacher composed of MS-word document (covering all the above three steps)

Project # 2

Group members:

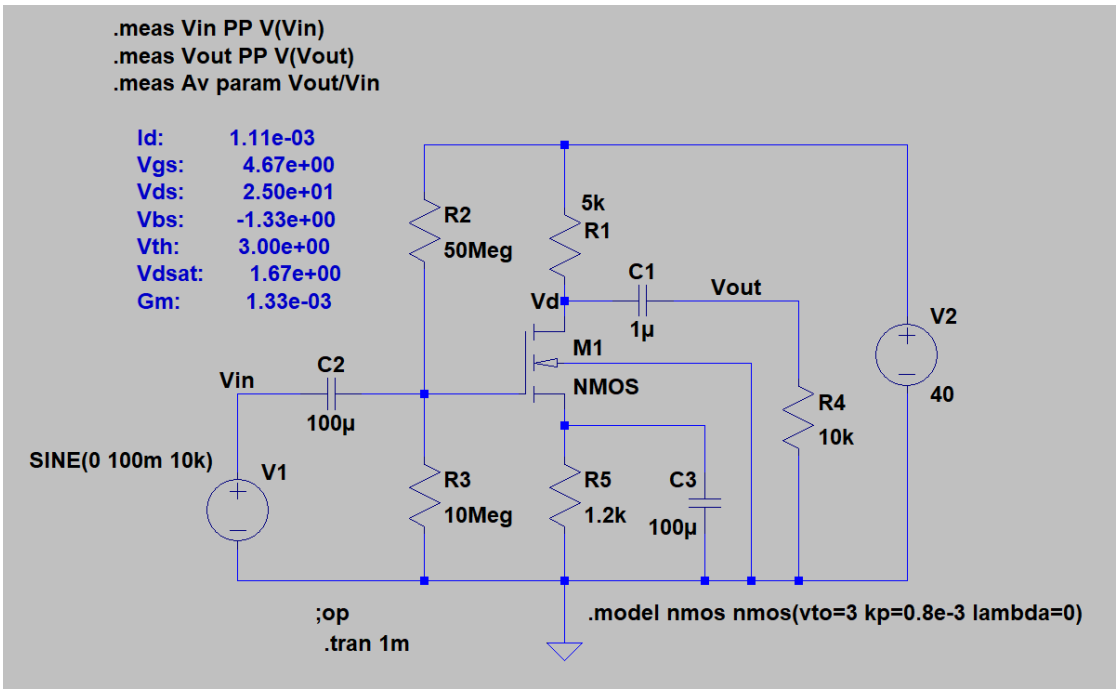
许贤伟 Xu Xianwei 20193296000023

童佳恩 Tong Jiaen20193296000081

i. **Do the** Mathematical Analysis i.e. DC and Small signal analysis of the MOSFET amplifier shown in figure and find the voltage gain (Reference class lecture #2 & 3)

ii. Simulate the circuit in LTSpice and plot the Gain in dB and Linear scale, find the 3db bandwidth (Reference class lecture #2 & 3)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 3

Group members:

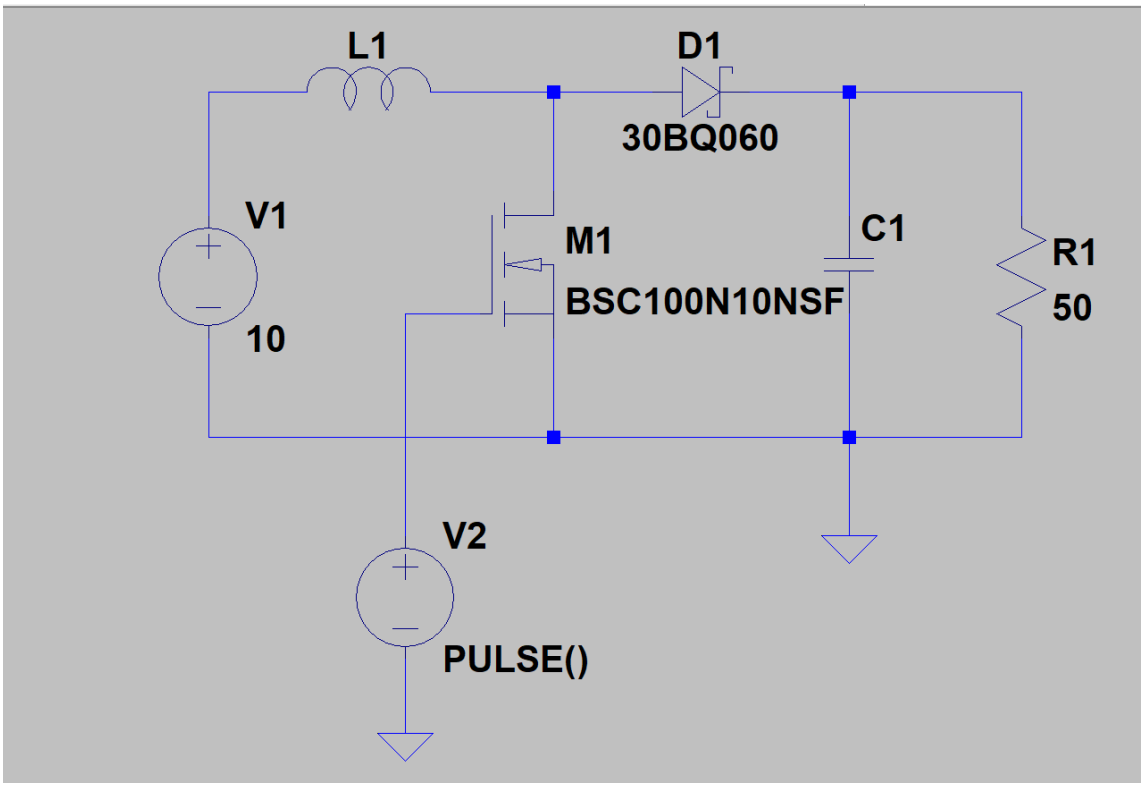
张静茹 Zhang Jingru 2019327100043

柯玲 Ke Ling 2019339902122

i. Design a boost converter that will have an output of 40 V from a 10-V source. Design for continuous inductor current and an output ripple voltage of less than one percent. The load is a resistance of 50 . Assume ideal components for this design.

ii. Simulate the circuit in LTSpice and plot the inductor current, capacitor current, output voltage and the switching signal(Reference class lecture #5 & 6)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 4

Group members:

魏文桐 Wei Wentong 2019329600137

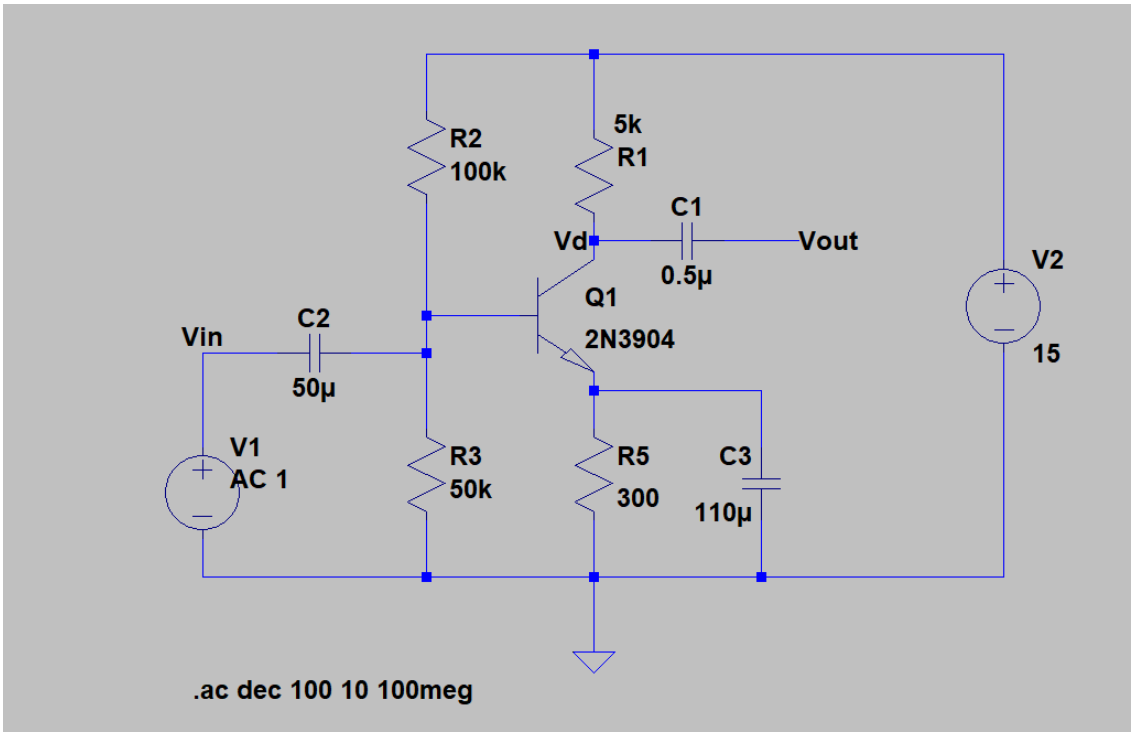
汪跃俊 Wang Yuejun 2019329600134

黎晓航 Li Xiaohang 2019329600129

i. **Do the** Mathematical Analysis i.e. DC and Small signal analysis of the amplifier shown in figure and find the voltage gain (Reference class lecture #1)

ii. Simulate the circuit in LTSpice and plot the Gain in dB and Linear scale, find the 3db bandwidth (Reference class lecture #1)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 5

Group members:

陈宇宁 Chen Yunning 2019329600123

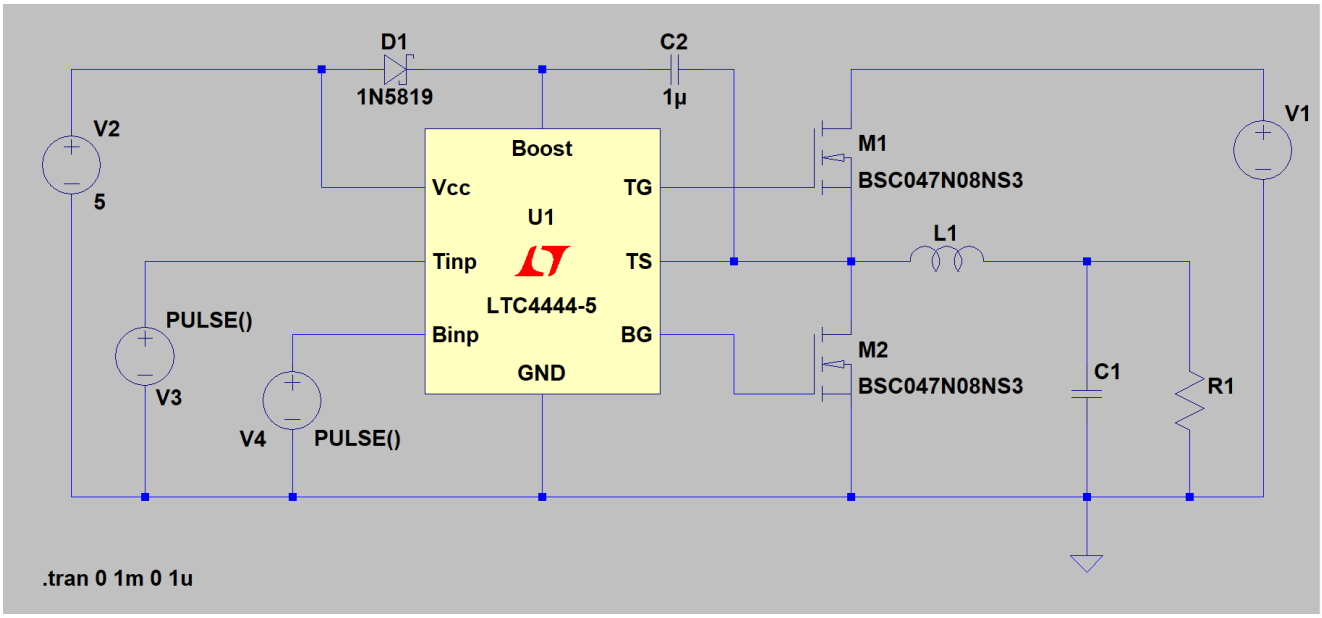
蒋振豪 Jiang Zhenhao 2019329600127

史君豪 Shi Junhao 2019330300058

i. Design a buck converter Vin (V1)= 40V and Vout = 20V, Load Current is 1A, inductor current variation is 40% of load current and operating frequency is 100kHz

ii. Simulate the circuit in LTSpice and plot the inductor current, capacitor current, output voltage and the switching signal(Reference class lecture #5 & 6)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 6

Group members:

李成杯 LiChengBei 2019329600044

程坤 ChengKun 2019329600006

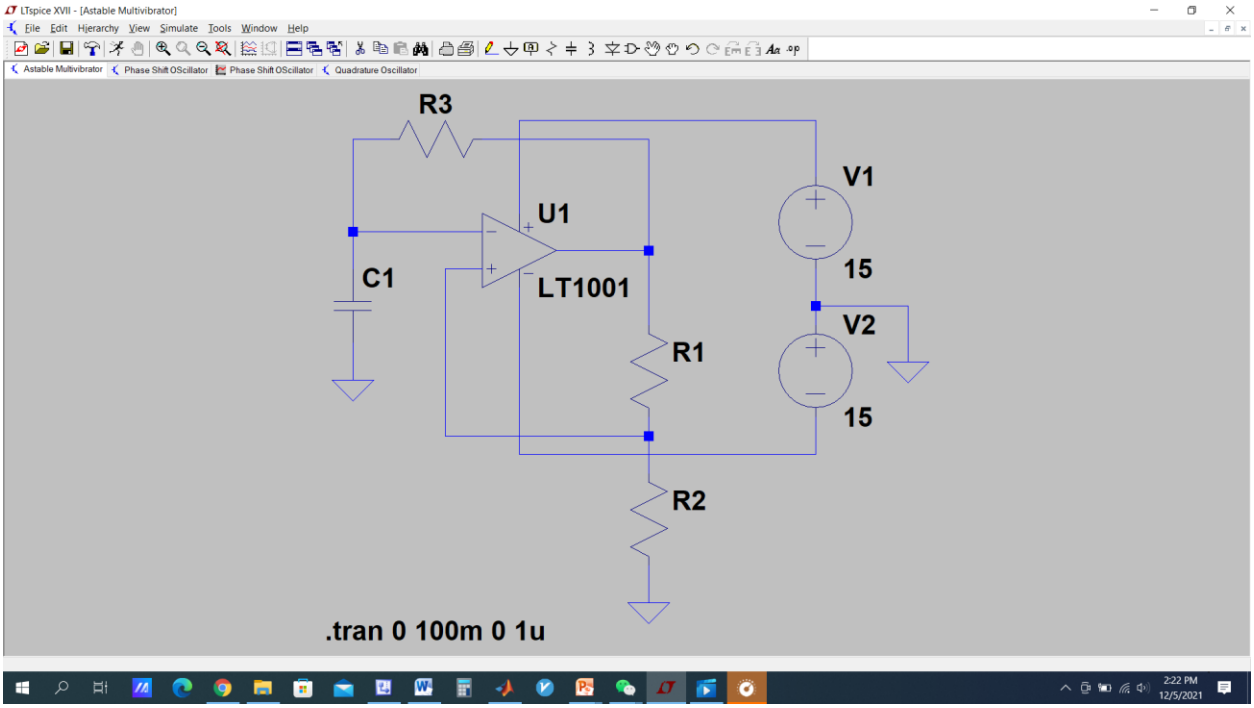
Design an Astable Multivibrator circuit shown in Figure below and generate a square wave with frequency of 500 kHz (Please refer to Lecture 8 (video lecture)).

The project report will be composed on the following steps

i. Mathematical Analysis

ii. Simulate the circuit in LTSpice

iii. Design the PCB of the amplifier using Altium Designer



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Project # 7

Group members:

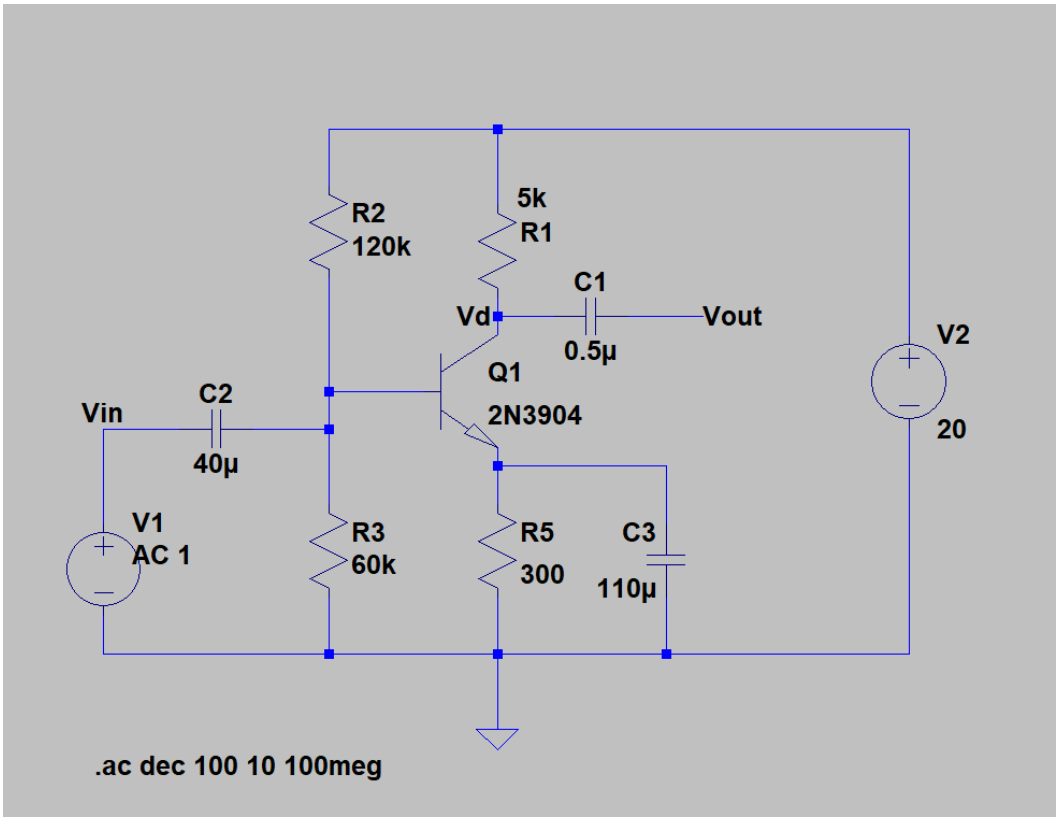
吴子山 Wu Zishan 2019329600004

陈星海 Chen Xinghai 2019330300270

i. **Do the** Mathematical Analysis i.e. DC and Small signal analysis of the amplifier shown in figure and find the voltage gain (Reference class lecture #1)

ii. Simulate the circuit in LTSpice and plot the Gain in dB and Linear scale, find the 3db bandwidth (Reference class lecture #1)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 8

Group members:

王温杰 Wang Wenjie 20193296001O4

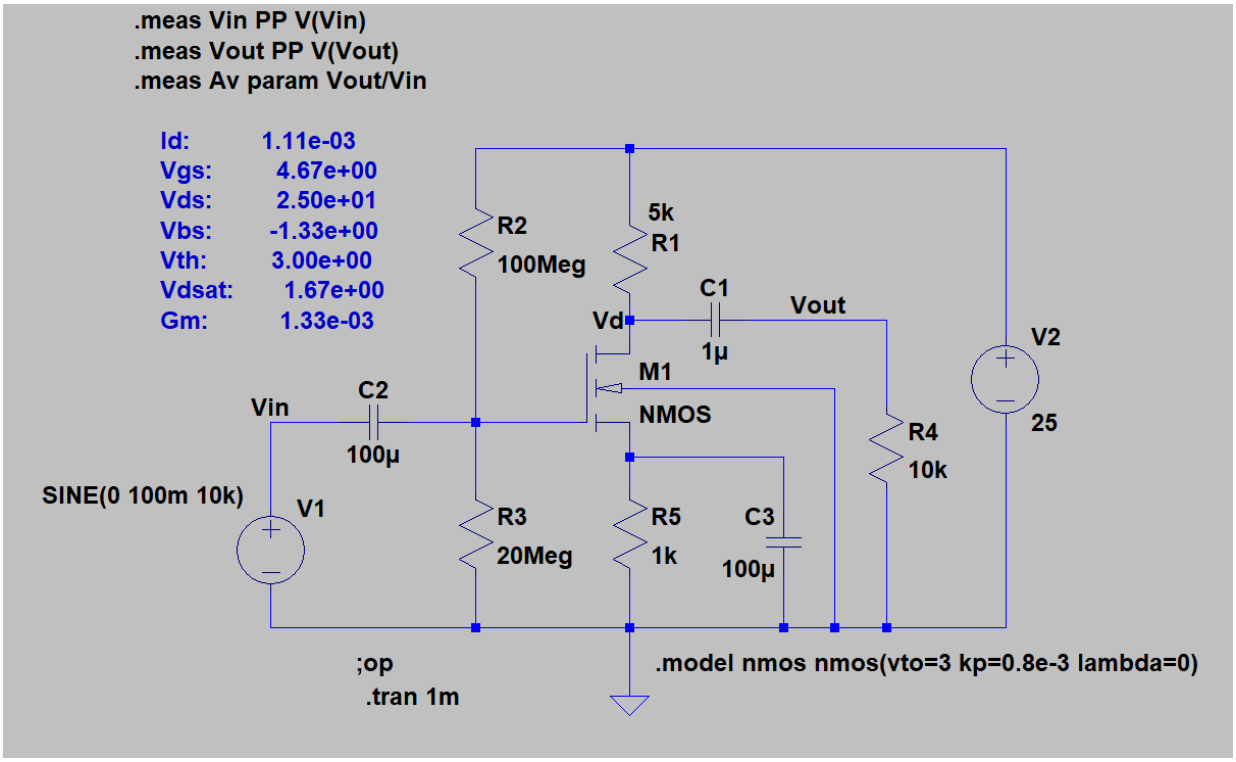
郭一 Guo Yi 20193296000039

赵景森 Zhao Jingsen 20193296001l5

i. Do the Mathematical Analysis i.e. DC and Small signal analysis of the MOSFET amplifier shown in figure and find the voltage gain (Reference class lecture #2 & 3)

ii. Simulate the circuit in LTSpice and plot the Gain in dB and Linear scale, find the 3db bandwidth (Reference class lecture #2 & 3)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 9

Group members:

杨涵 Yang Han 20193296001 38

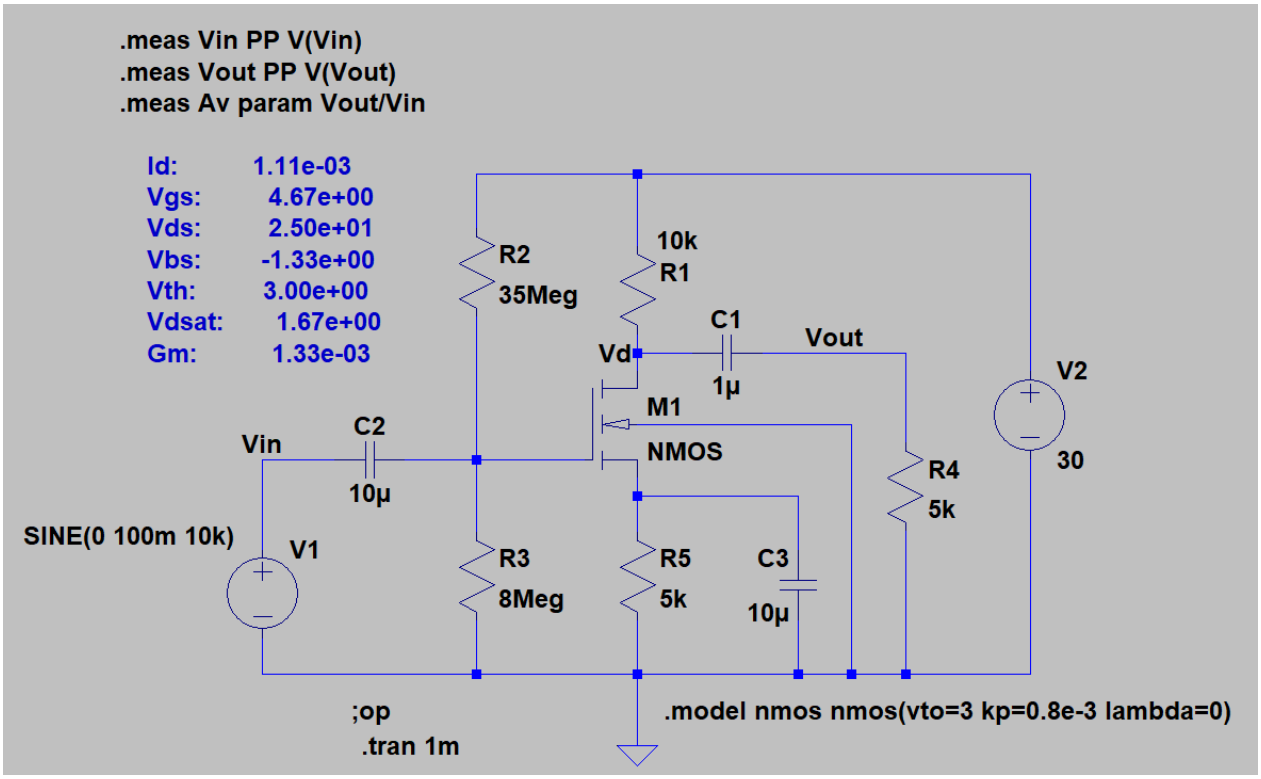
王宇航 Wang Yuhang 20193296001 36

张辰宇 Zhang Chenyu 20193296000 54

i. Do the Mathematical Analysis i.e. DC and Small signal analysis of the MOSFET amplifier shown in figure and find the voltage gain (Reference class lecture #2 & 3)

ii. Simulate the circuit in LTSpice and plot the Gain in dB and Linear scale, find the 3db bandwidth (Reference class lecture #2 & 3)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 10

Group members:

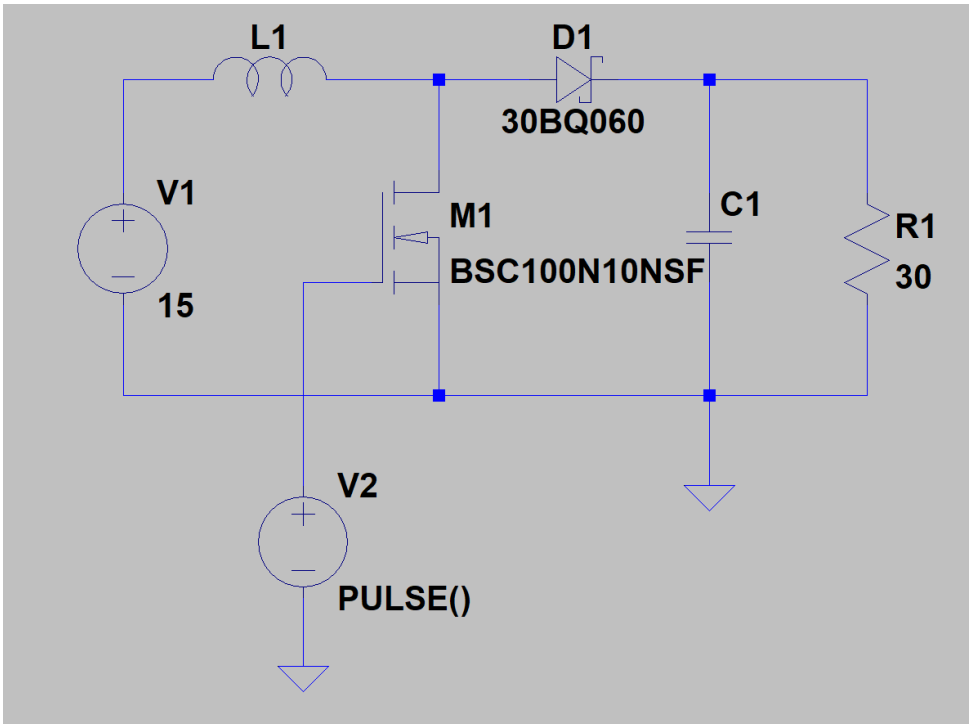
杨晨乾 Yang Chenqian 20193296000052

郑嘉琪 Zheng Jiaqi 20193296000057

i. Design a boost converter that will have an output of 45 V from a 15-V source. Design for continuous inductor current and an output ripple voltage of less than one percent. The load is a resistance of 30-Ohm. Assume ideal components for this design.

ii. Simulate the circuit in LTSpice and plot the inductor current, capacitor current, output voltage and the switching signal(Reference class lecture #5 & 6)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 11

Group members:

葛良旺 Ge Liangwang 2019329600038

王玉 Wang Yu 2019329600050

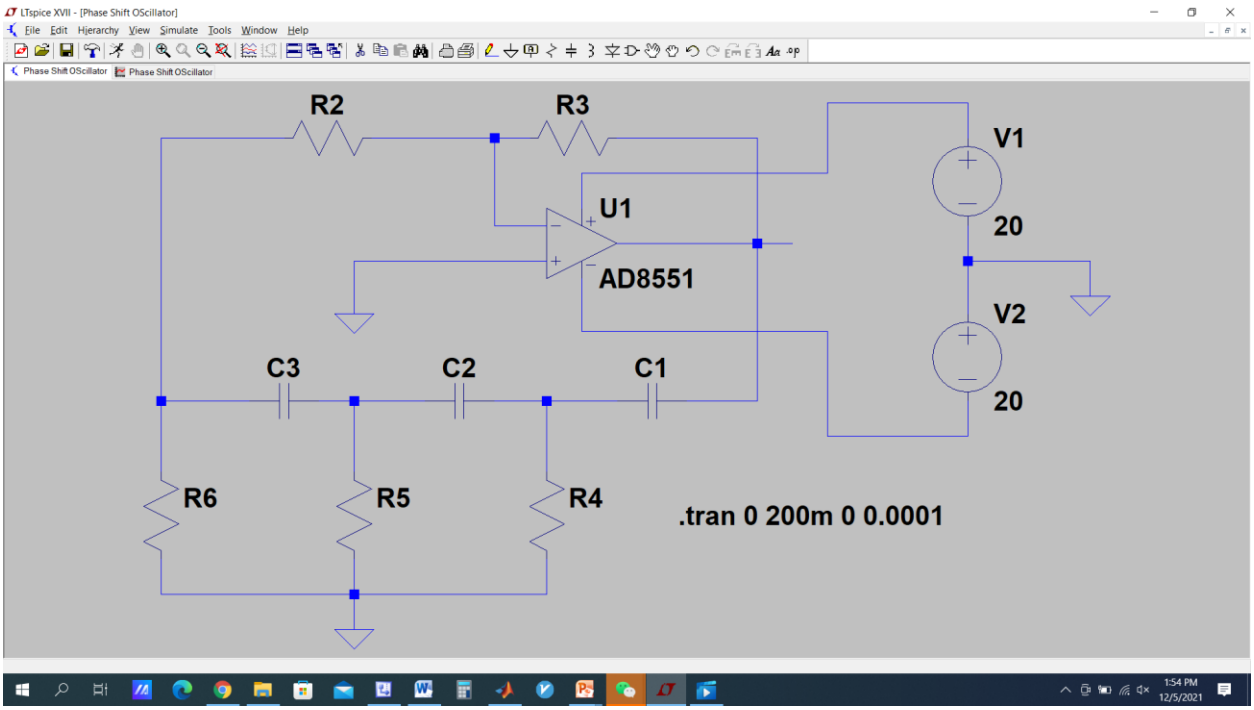
Design and mathematically a Phase shift oscillator generating a frequency of 250 kHz (Please refer to Lecture 7 (video lecture)).

The project report will be composed on the following steps

i. Mathematical Analysis

ii. Simulate the circuit in LTSpice

iii. Design the PCB of the amplifier using Altium Designer



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Project # 12

Group members:

陈天霖 Chen Tianlin 2019329600035

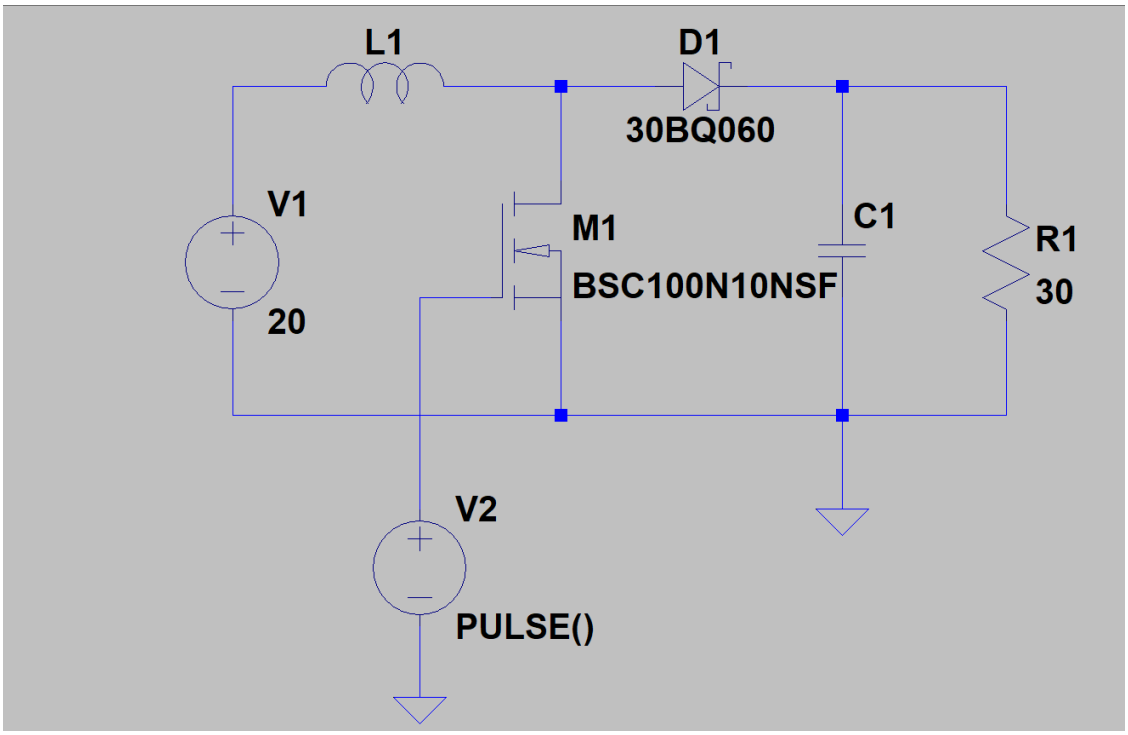
张志远 Zhangzhiyuan 2019329600055

阚昊宇 Kan Haoyu 2019329600128

i. Design a boost converter that will have an output of 60 V from a 20V source. Design for continuous inductor current and an output ripple voltage of less than one percent. The load is a resistance of 30-Ohm. Assume ideal components for this design.

ii. Simulate the circuit in LTSpice and plot the inductor current, capacitor current, output voltage and the switching signal(Reference class lecture #5 & 6)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 13

Group members:

李博 Li Bo 2019330361015

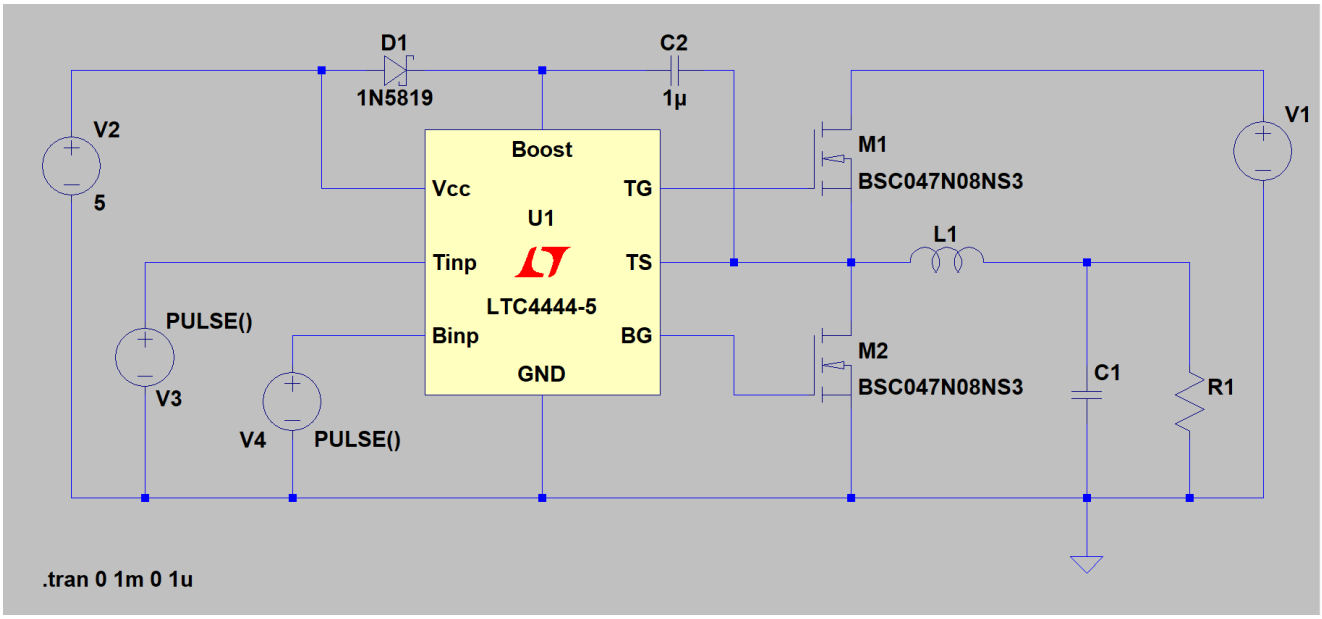
徐誉宁 Xu Yuning 2019329600109

叶毅 Ye Yi 2019329600111

i. Design a buck converter Vin (V1)= 50V and Vout = 10V, Load Current is 1A, inductor current variation is 30% of load current and operating frequency is 150kHz

ii. Simulate the circuit in LTSpice and plot the inductor current, capacitor current, output voltage and the switching signal(Reference class lecture #5 & 6)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 14

Group members:

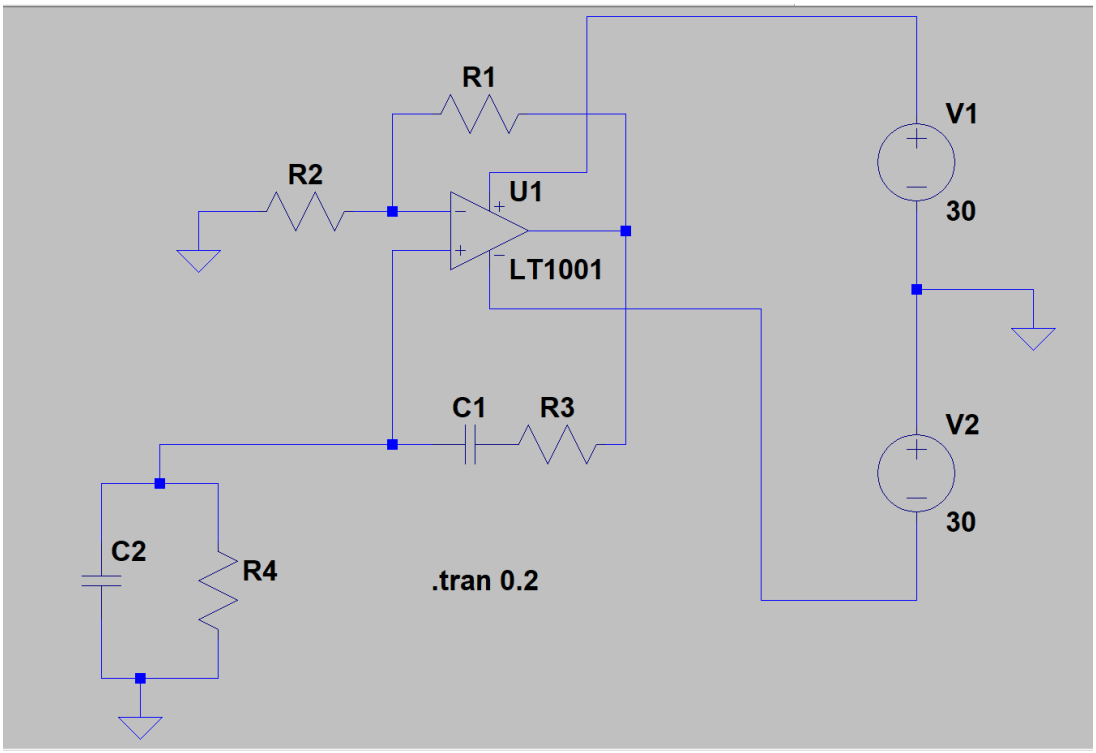
胡逸飞 Hu Yifei 2019337261145

康健雄 Kang Jianxiong 2019327100083

Design and mathematically a Wein-Bridge oscillator generating a frequency of 100 kHz (Please refer to Lecture 7 (video lecture)).

The project report will be composed on the following steps

i. Mathematical Analysis
ii. Simulate the circuit in LTSpice
iii. Design the PCB of the amplifier using Altium Designer



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Project # 15

Group members:

方世纪 Fang Shiji 2019329600094

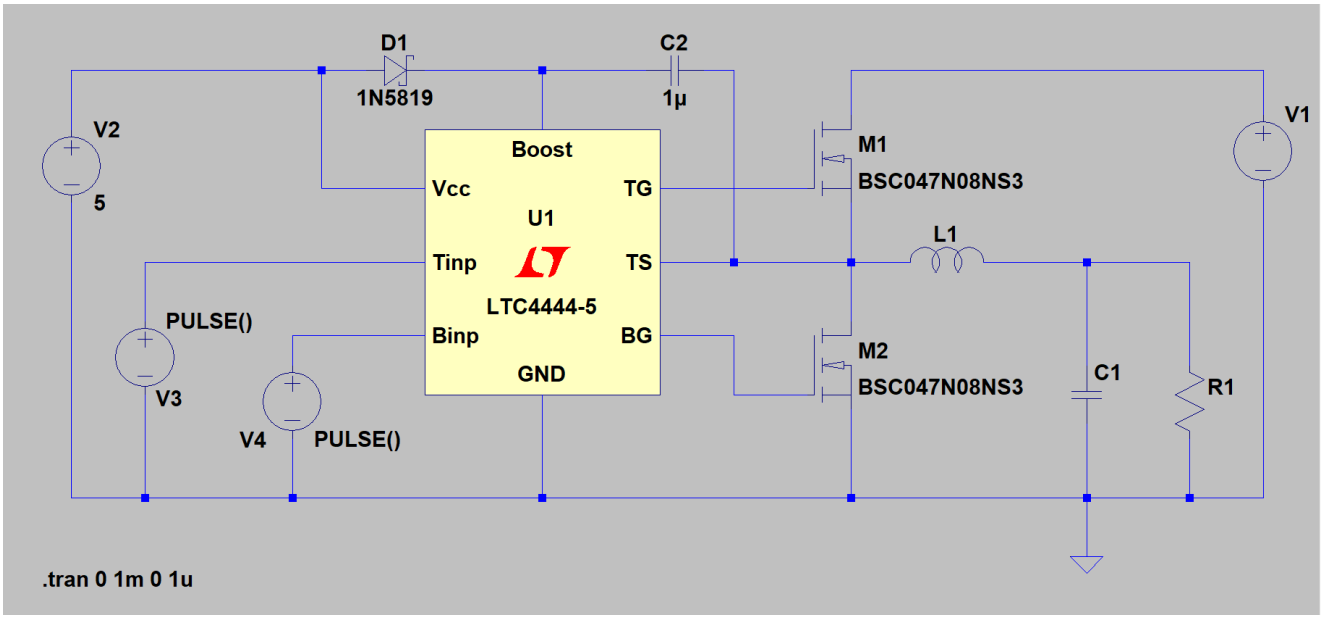
樊星 Fan Xing 2019329600093

刘以凡 Liu Yifan 2019329600099

i. Design a buck converter Vin (V1)= 70V and Vout = 40V, Load Current is 1.5A, inductor current variation is 35% of load current and operating frequency is 250kHz

ii. Simulate the circuit in LTSpice and plot the inductor current, capacitor current, output voltage and the switching signal(Reference class lecture #5 & 6)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 16

Group members:

李志豪 Li zhihao 20193296000097

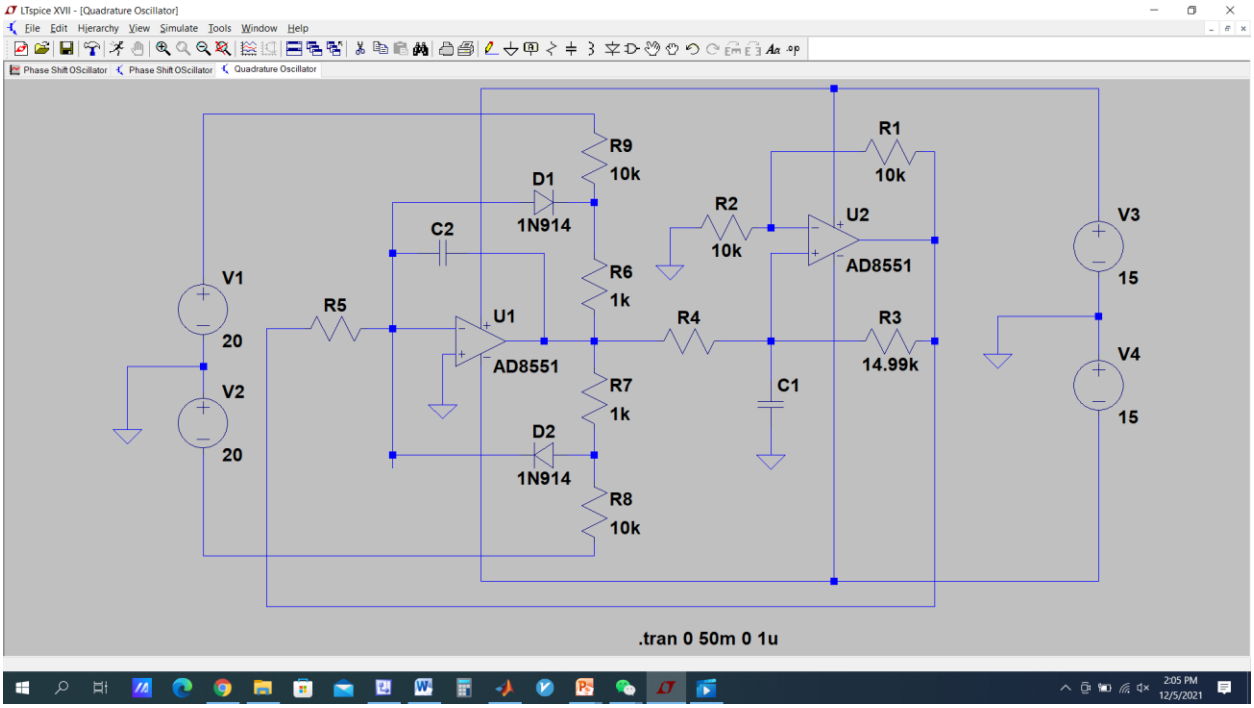
张海丰 Zhang haifeng 20193296000114

戴晶峰 Dai Jingfeng 20193296000037

Design and mathematically a quadrature oscillator generating a frequency of 100 kHz (Please refer to Lecture 8 (video lecture)).

The project report will be composed on the following steps

i. Mathematical Analysis
ii. Simulate the circuit in LTSpice
iii. Design the PCB of the amplifier using Altium Designer



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Project # 17

Group members:

过泽栋 Guo Zedong 2019331201019

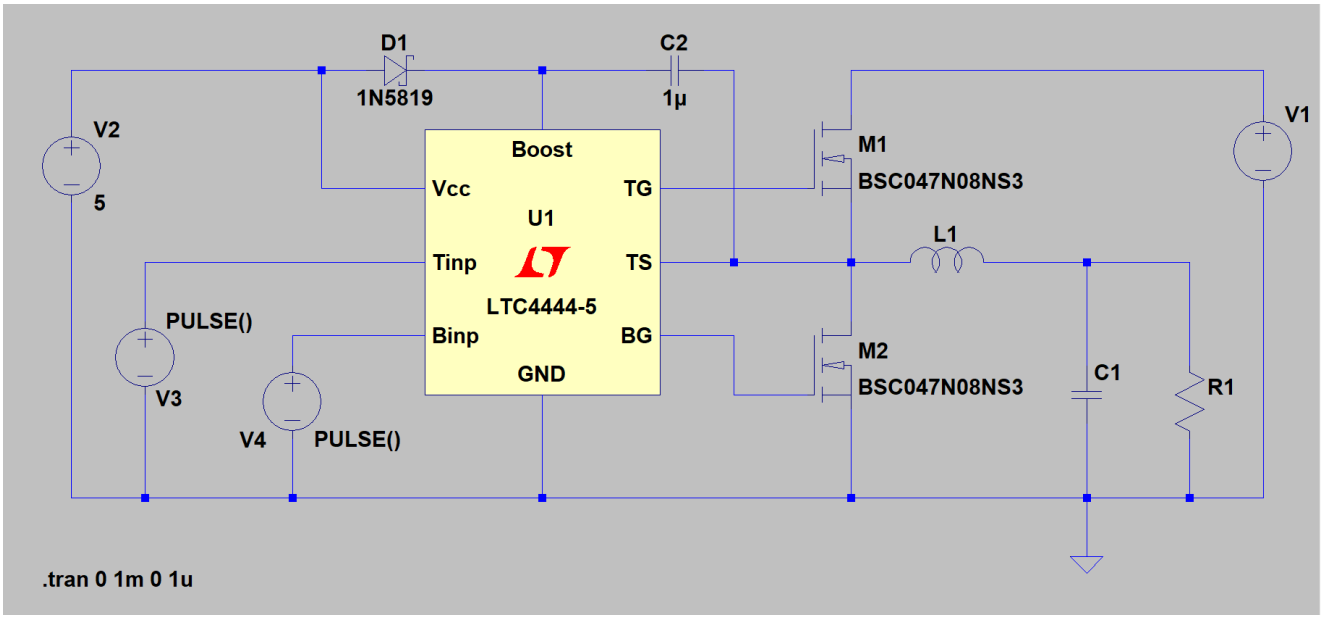
张振洋 Zhang Zhenyang 2019329600142

蒋武鹏 Jiang Wupeng 2019327130014

i. Design a buck converter Vin (V1)= 30V and Vout = 10V, Load Current is 2.5A, inductor current variation is 35% of load current and operating frequency is 300kHz

ii. Simulate the circuit in LTSpice and plot the inductor current, capacitor current, output voltage and the switching signal(Reference class lecture #5 & 6)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 18

Group members:

尤彦辰 You Yanchen2019330300226

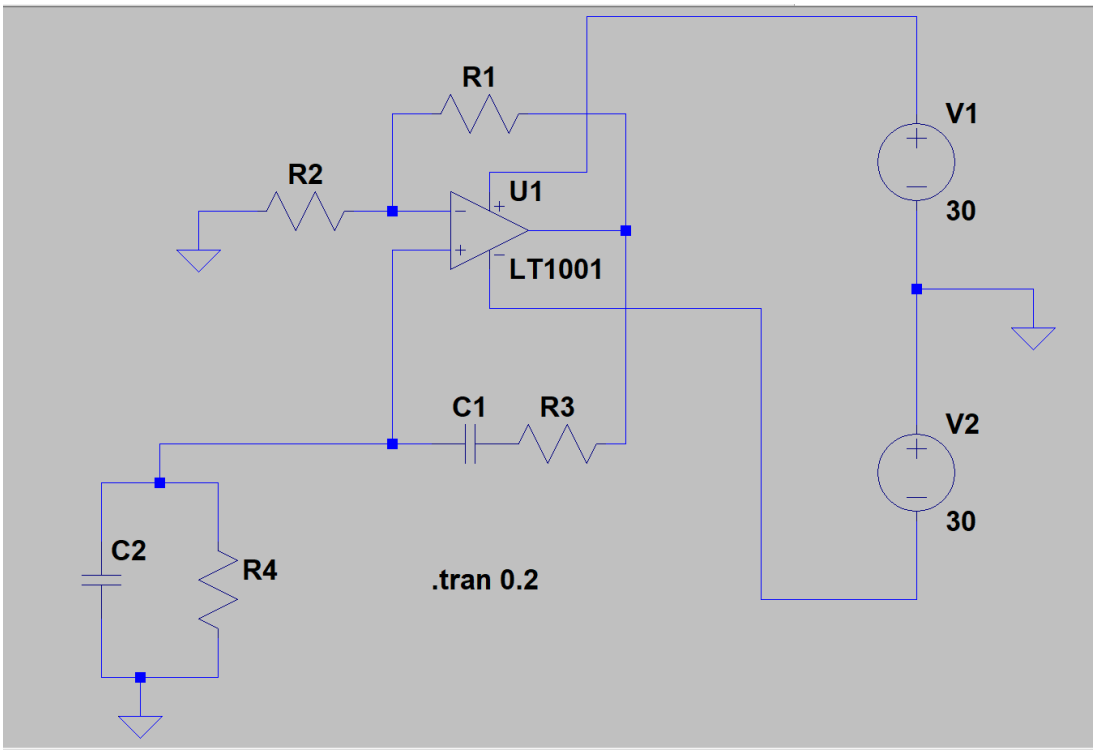
金飞宇 Jin Feiyu2019329600096

叶俊龙 Ye Junlong2019329600110

Design and mathematically a Wein-Bridge oscillator generating a frequency of 50kHz (Please refer to Lecture 7 (video lecture))

The project report will be composed on the following steps

i. Mathematical Analysis
ii. Simulate the circuit in LTSpice
iii. Design the PCB of the amplifier using Altium Designer



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Project # 19

Group members:

吕润年 Lv Runnian 2019339901050

陆云昊 Lu Yunhao 2019339901049

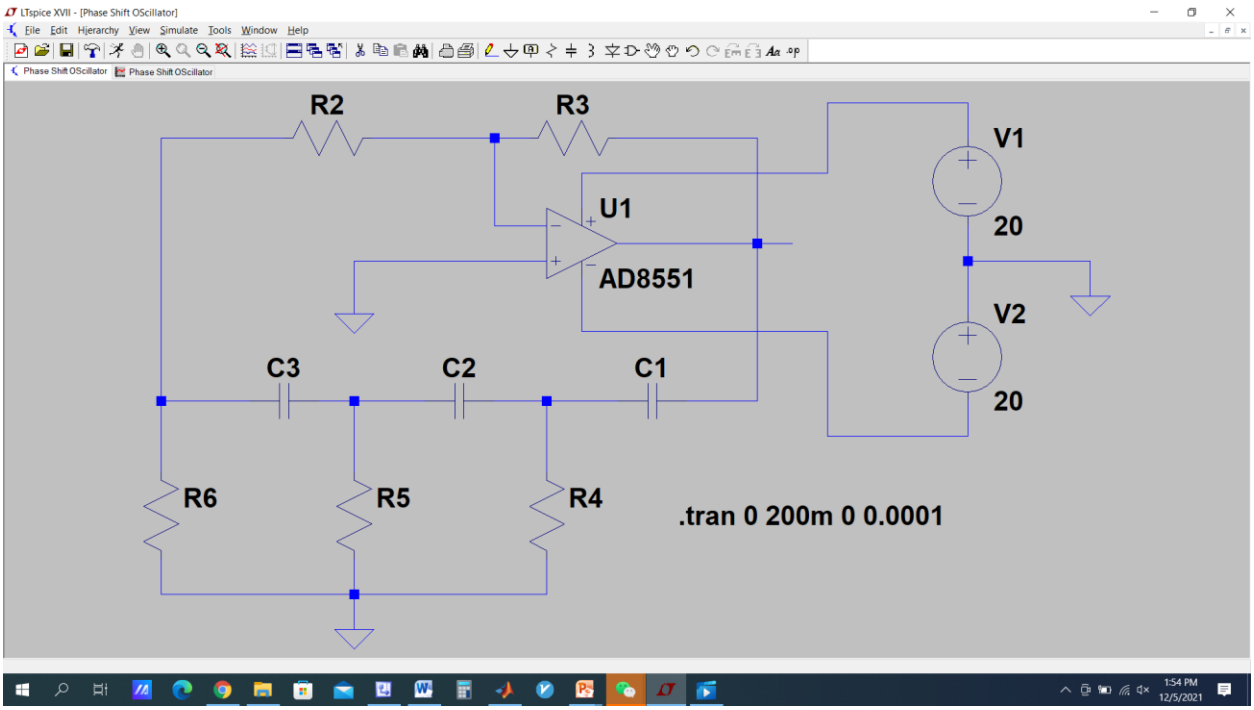
Design and mathematically a Phase shift oscillator generating a frequency of 500 kHz (Please refer to Lecture 7 (video lecture)).

The project report will be composed on the following steps

i. Mathematical Analysis

ii. Simulate the circuit in LTSpice

iii. Design the PCB of the amplifier using Altium Designer



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Project # 20

Group members:

王裕　Wang Yu　2019330308121

黄辰宇 Huang Chen Yu 2019330300108

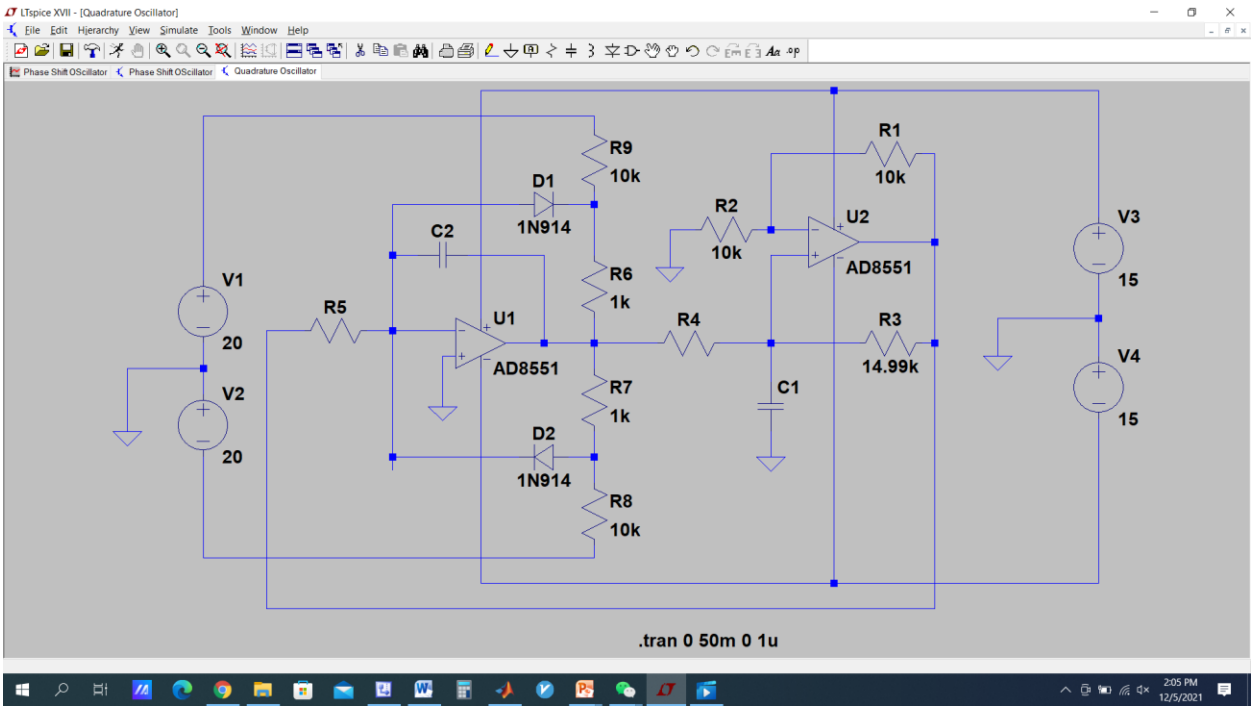
Design and mathematically a quadrature oscillator generating a frequency of 350 kHz (Please refer to Lecture 8 (video lecture)).

The project report will be composed on the following steps

i. Mathematical Analysis

ii. Simulate the circuit in LTSpice

iii. Design the PCB of the amplifier using Altium Designer



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Project # 21

Group members:

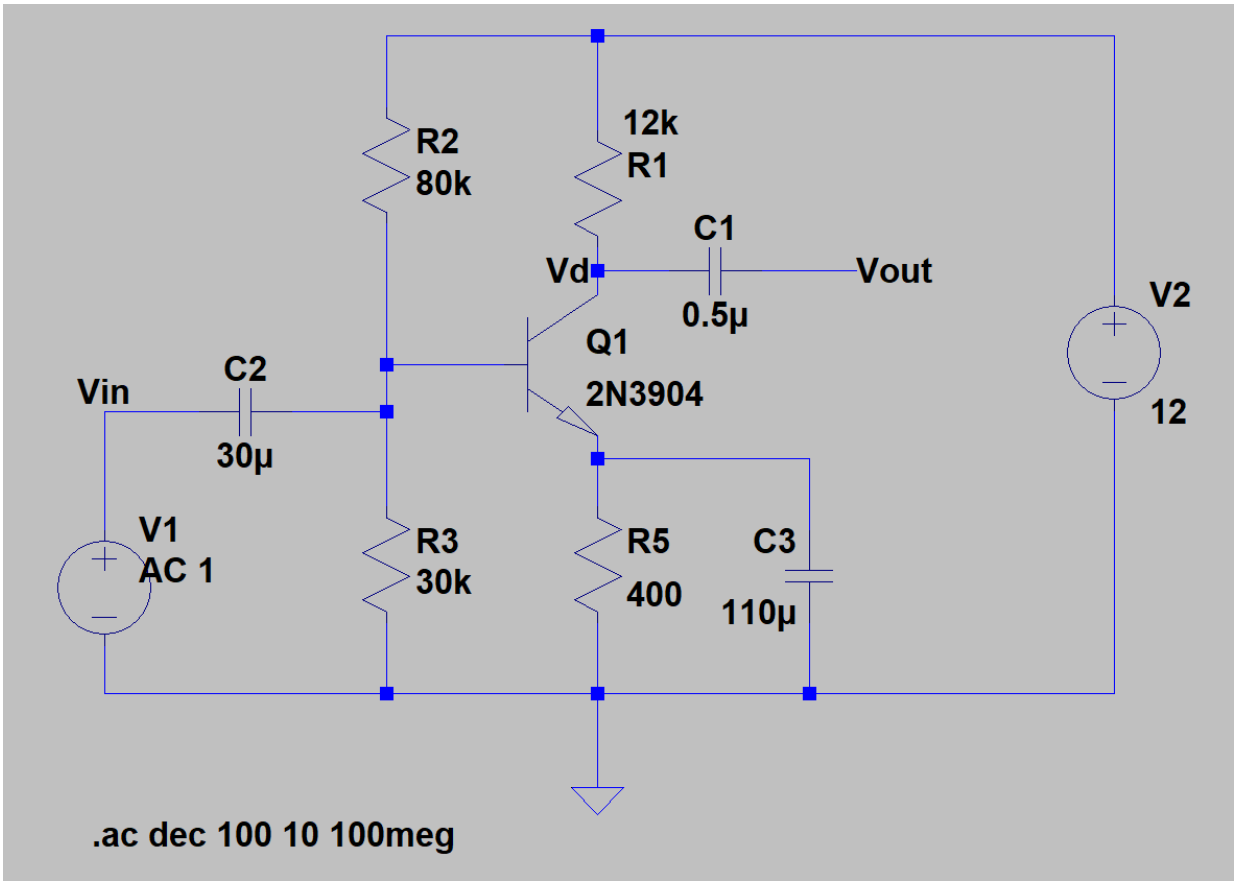
辛巩琦 Xing Gongqi 20193296001O7

胥亦璇 Xu Yixuan 20193296001O8

i. **Do the** Mathematical Analysis i.e. DC and Small signal analysis of the amplifier shown in figure and find the voltage gain (Reference class lecture #1)

ii. Simulate the circuit in LTSpice and plot the Gain in dB and Linear scale, find the 3db bandwidth (Reference class lecture #1)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 22

Group members:

朱子安 Zhu Zia 2019329600058

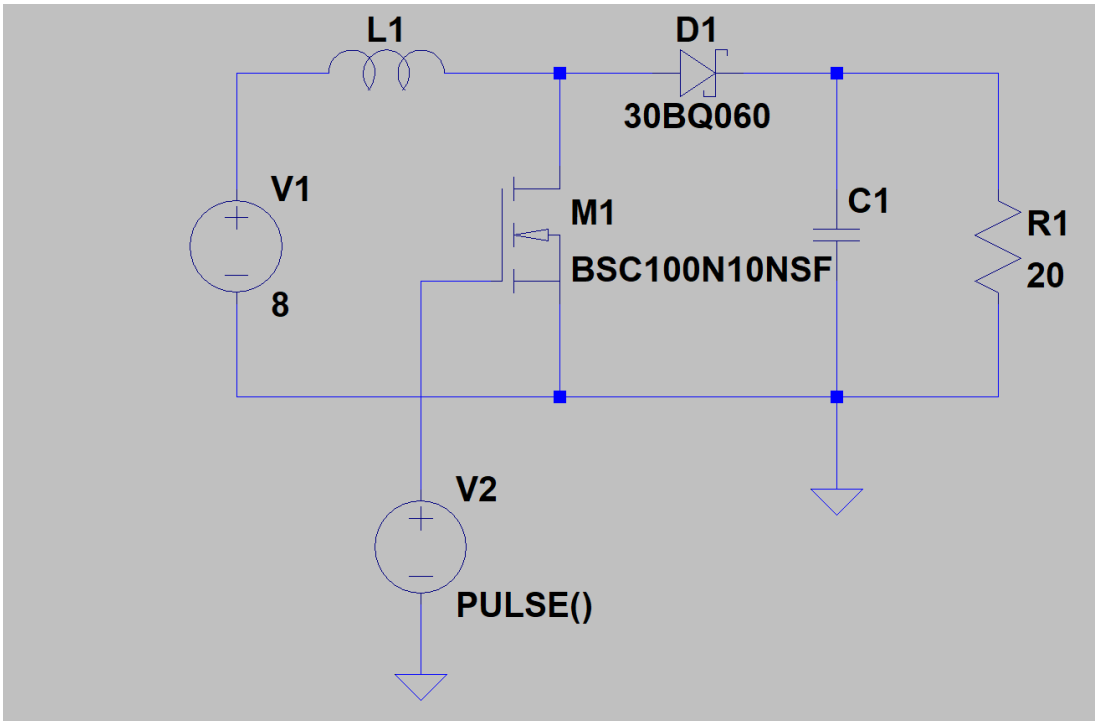
曲　正 Qu Zheng 2019327130017

商梓言 Shang Ziyan 2019339900030

i. Design a boost converter that will have an output of 30 V from an 8V source. Design for continuous inductor current and an output ripple voltage of less than one percent. The load is a resistance of 20-Ohm. Assume ideal components for this design.

ii. Simulate the circuit in LTSpice and plot the inductor current, capacitor current, output voltage and the switching signal(Reference class lecture #5 & 6)

iii. Design the PCB of the amplifier using Altium Designer



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Project # 23

Group members:

从天昊 Cong Tianhao 20193296000065

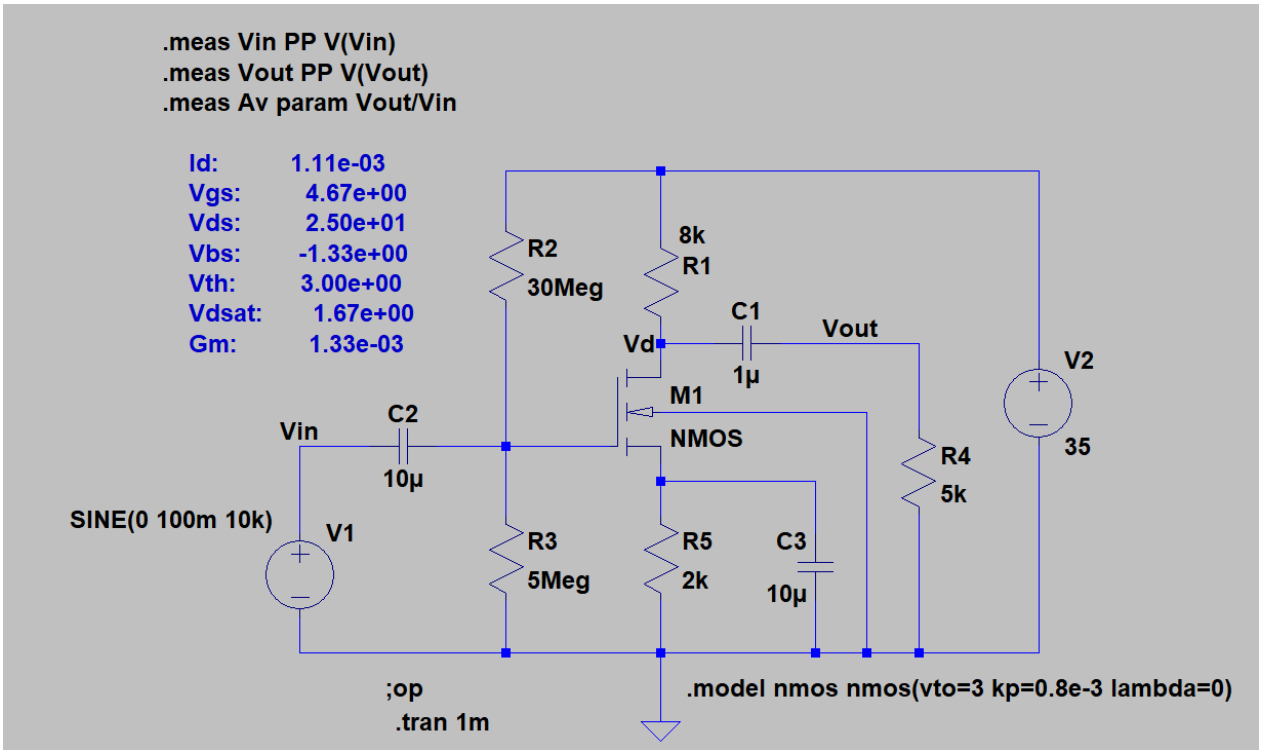
陈晨 Chen Chen 20193296000063

胡涵嘉 Hu Hanjia 20193296000066

i. Do the Mathematical Analysis i.e. DC and Small signal analysis of the MOSFET amplifier shown in figure and find the voltage gain (Reference class lecture #2 & 3)

ii. Simulate the circuit in LTSpice and plot the Gain in dB and Linear scale, find the 3db bandwidth (Reference class lecture #2 & 3)

iii. Design the PCB of the amplifier using Altium Designer



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