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Questions

SDM242 and Project

1. What do you expect to learn in SDM242?
2. What project are you interested?
3. Suggestions, comments or questions.

1. 电路基础知识；应用类机器人内部结构与程序
2. 了解应用类机器人/家电结构与程序
3. none at the moment

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Questions

Raspberry Pi

1. What are the differences between a Raspberry Pi and an Arduino?
2. What can you do with a raspberry pi?
3. What are the components of a modern electronic system, such as a raspberry pi? A robot?
4. What is computer architecture? What are the necessary components in a computer?

1.

2. 可以对机器或机器人进行嵌入式编程

3. 接收器 处理器 放置(执行)器

4. 输入 处理 输出

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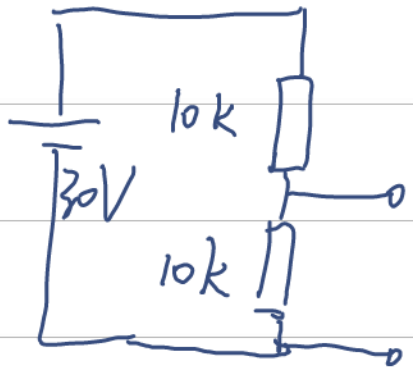
Passive Component 被动元器件

Thevenin Equivalent Circuit

$$\begin{cases} V_{th} = V_{open\ circuit} \\ R_{th} = \dfrac{V_{open\ circuit}}{I_{short\ circuit}} \end{cases}$$

eg



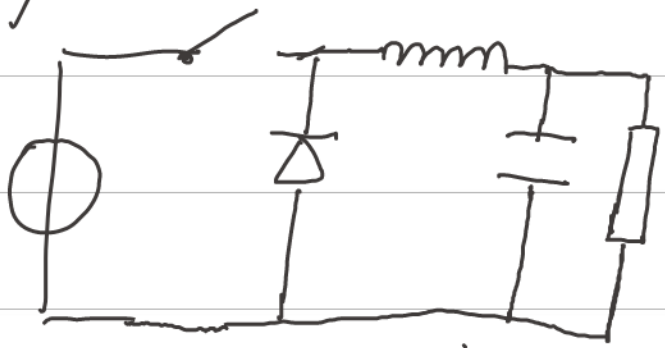
求V_{th}，接处两端直流电压

$V_{th} = 15V$

求R_{th}，$I_{short\ circuit}$ 短接电流3×10^{-3}，$R_{th} = 5k\Omega$

Duty cycle D

Buck



变压 不损耗能量

$$V_L = L\frac{dI_L}{dt}$$

$$\Delta I_{on} = \int_0^{t_{on}} \frac{V_L}{L}\,dt = \frac{V_i - V_o}{L} t_{on}$$

$$\Delta I_{off} = \int_{t_{on}}^{t_{on}+t_{off}} \frac{V_L}{L}\,dt = -\frac{V_o}{L} t_{off}$$

Boost

Buck Boost

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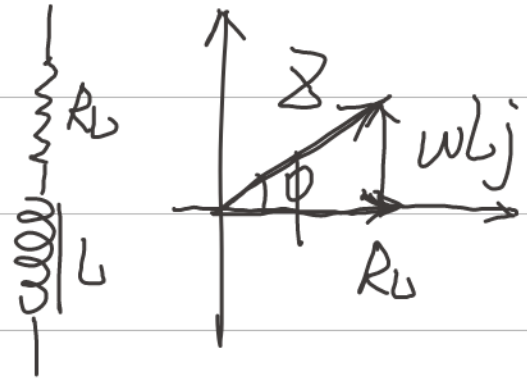
Diode = 报管 rectification

推导 $\frac{V_i - V_o}{L} t_{on} = \frac{-V_o}{L} t_{off} \Rightarrow D = \frac{V_o}{V_i}$

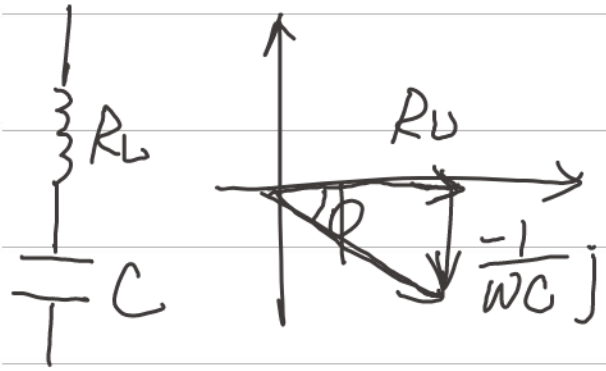
LED light-emitted-diode

$Z_L = \omega L \quad Z_C = \frac{1}{\omega C}$



$\tan\phi = \frac{\omega L}{R_L}$

$Z = \sqrt{R_L^2 + (\omega L)^2}$



$\tan\phi = \frac{\frac{1}{\omega C}}{R_L}$

$Z = \sqrt{R_L^2 + (\omega L^2)}$

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Fourier Transform