

第8章

数模转换器和模数转换器

Video Image Processing (VIP)

Research Group @ Fudan

<http://soc.fudan.edu.cn/vip/>

范益波

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本章内容

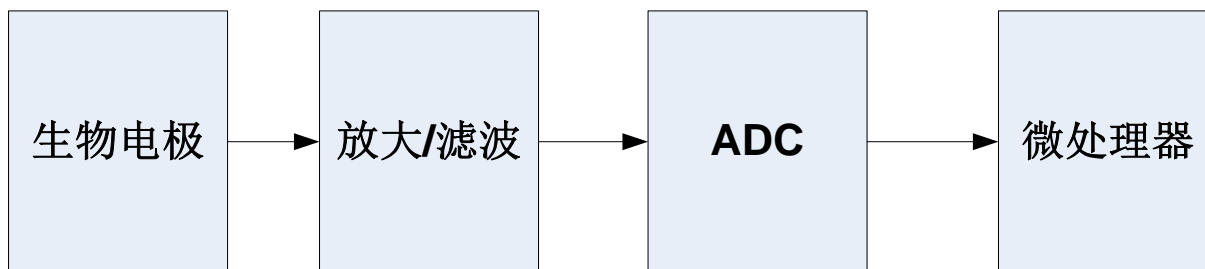
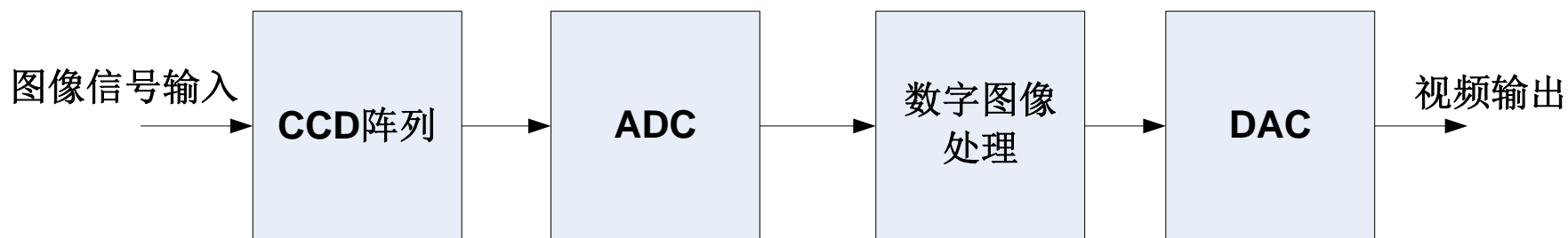
- 真实世界是模拟的，怎么样转为数字化处理？

本章要求

- 了解数模转换器和模数转换器的基本性能指标和基本电路

数模转换器和模数转换器

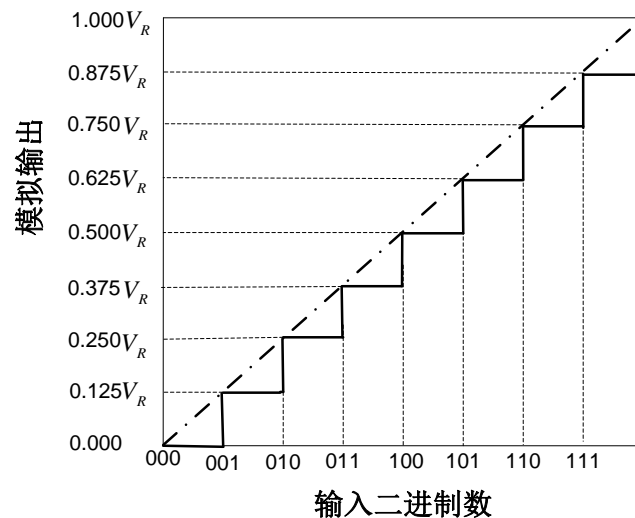
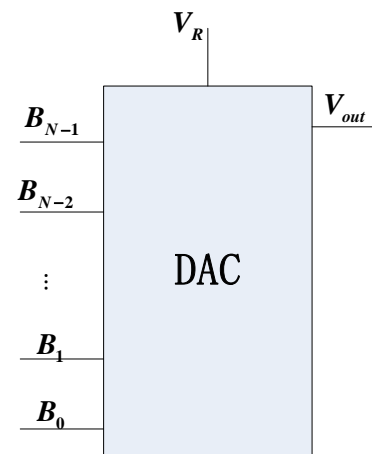
概述



数模转换器

概述

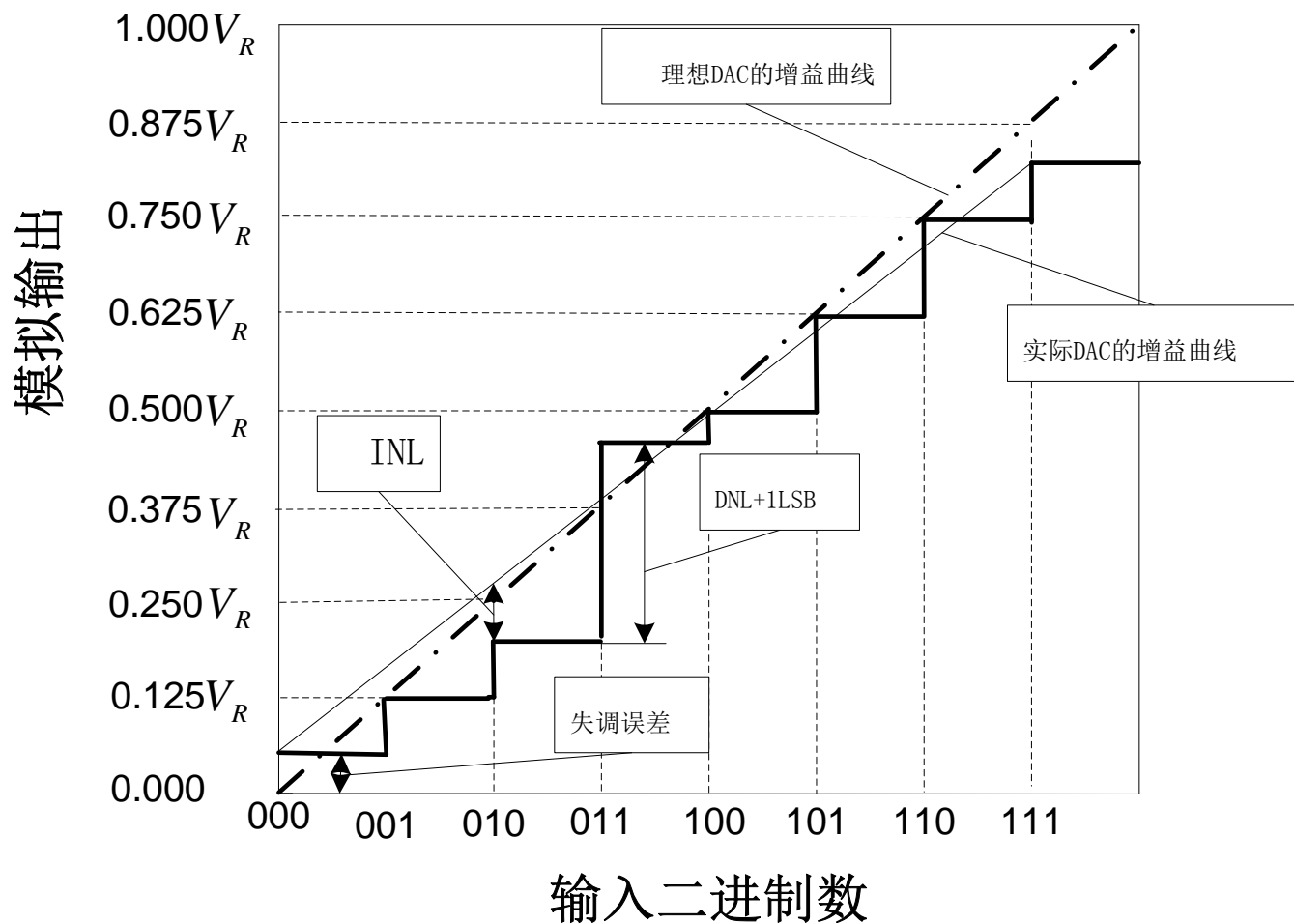
$$\begin{aligned} V_{out} &= (B_{N-1}2^{N-1} + B_{N-2}2^{N-2} + \dots + B_22^2 + B_12^1 + B_02^0) \times V_R \times K \\ &= K \times V_R \times (\sum_{i=0}^{N-1} B_i 2^i) \end{aligned}$$



数模转换器的性能指标

静态性能指标

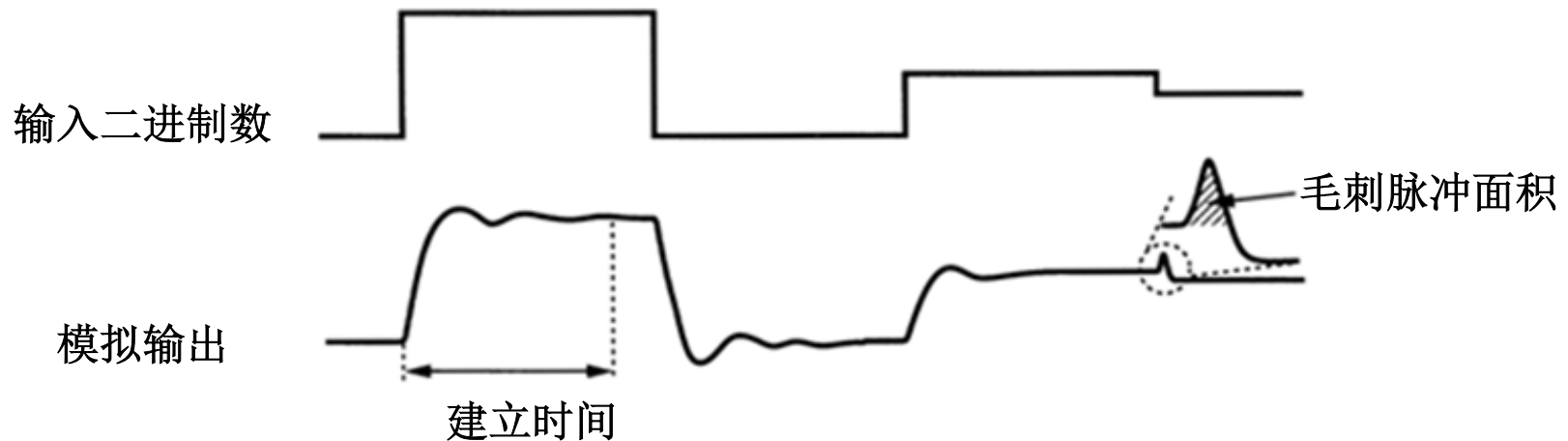
- 失调误差
- 微分非线性(DNL)
- 积分非线性(INL)
- 增益误差



数模转换器的性能指标

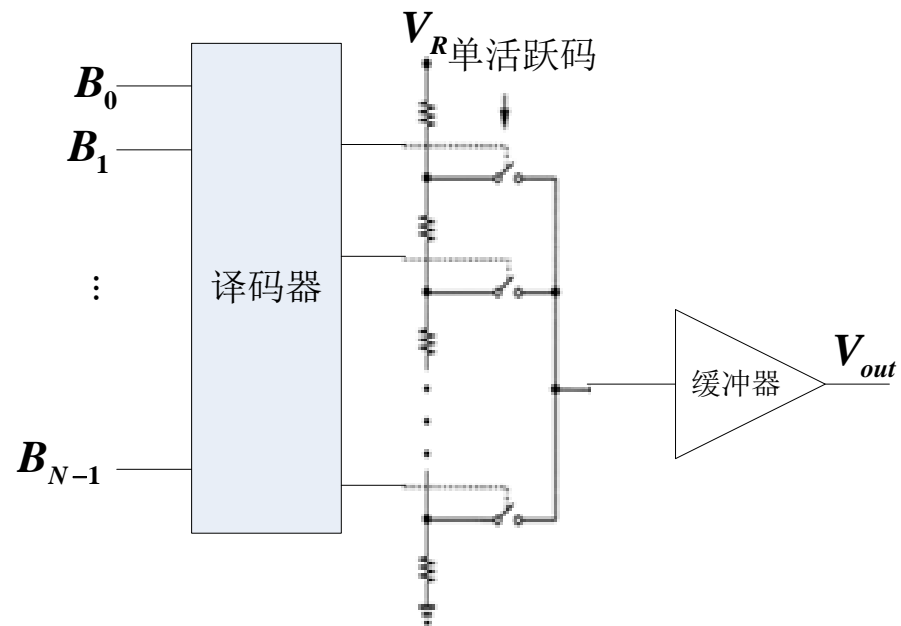
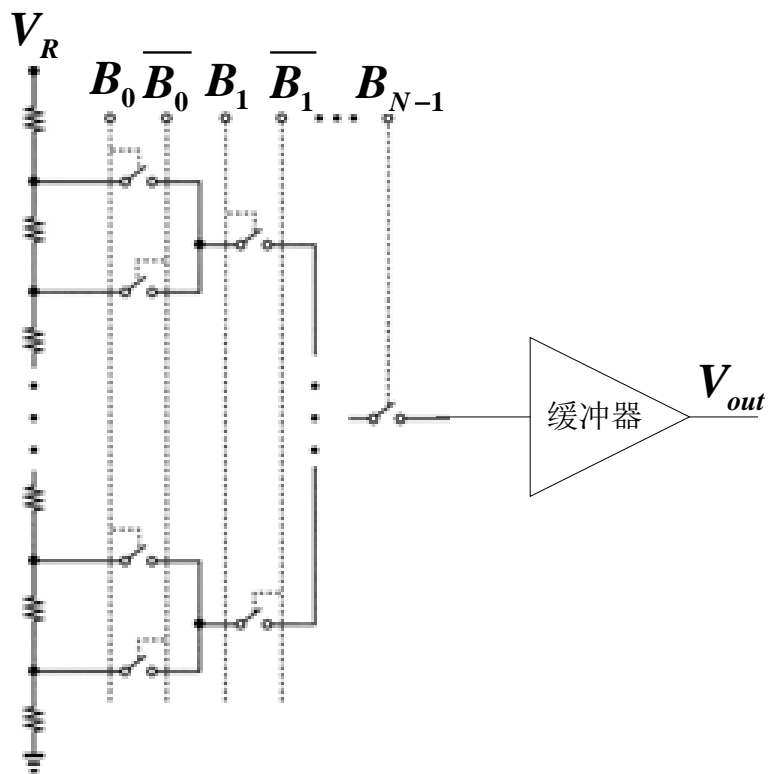
动态性能指标

- 建立时间
- 毛刺脉冲面积



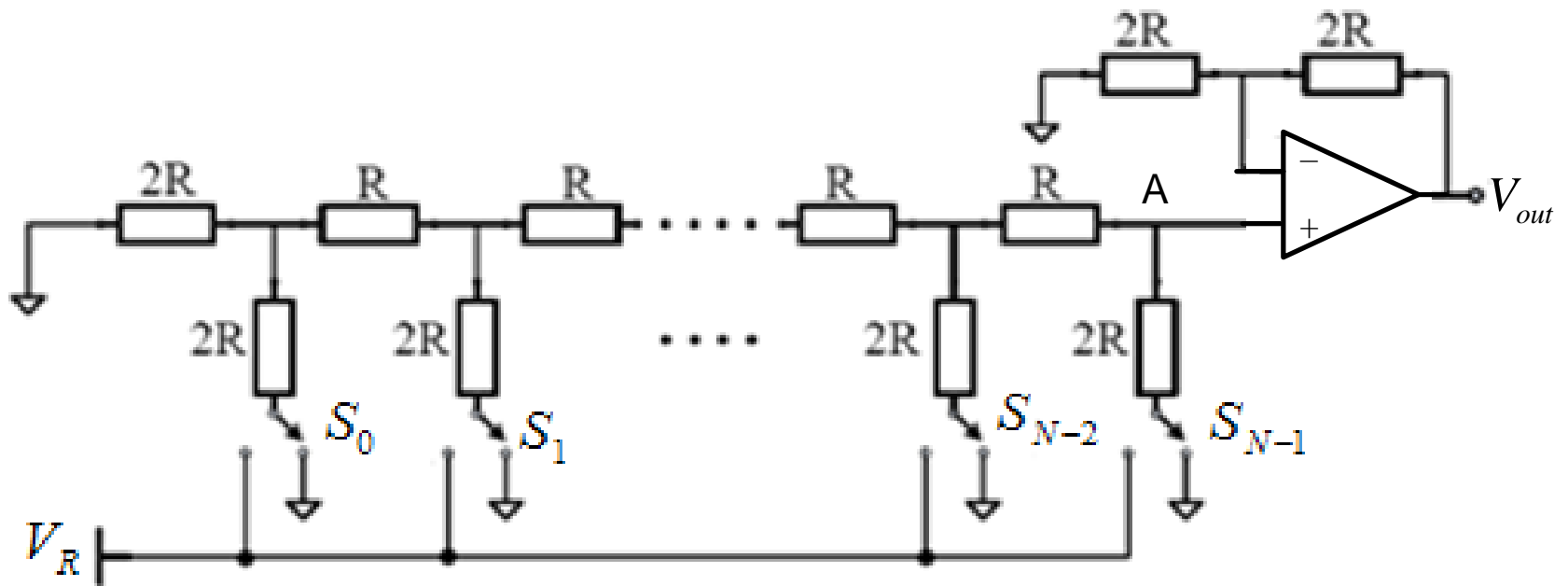
数模转换器电路

电阻分压型DAC

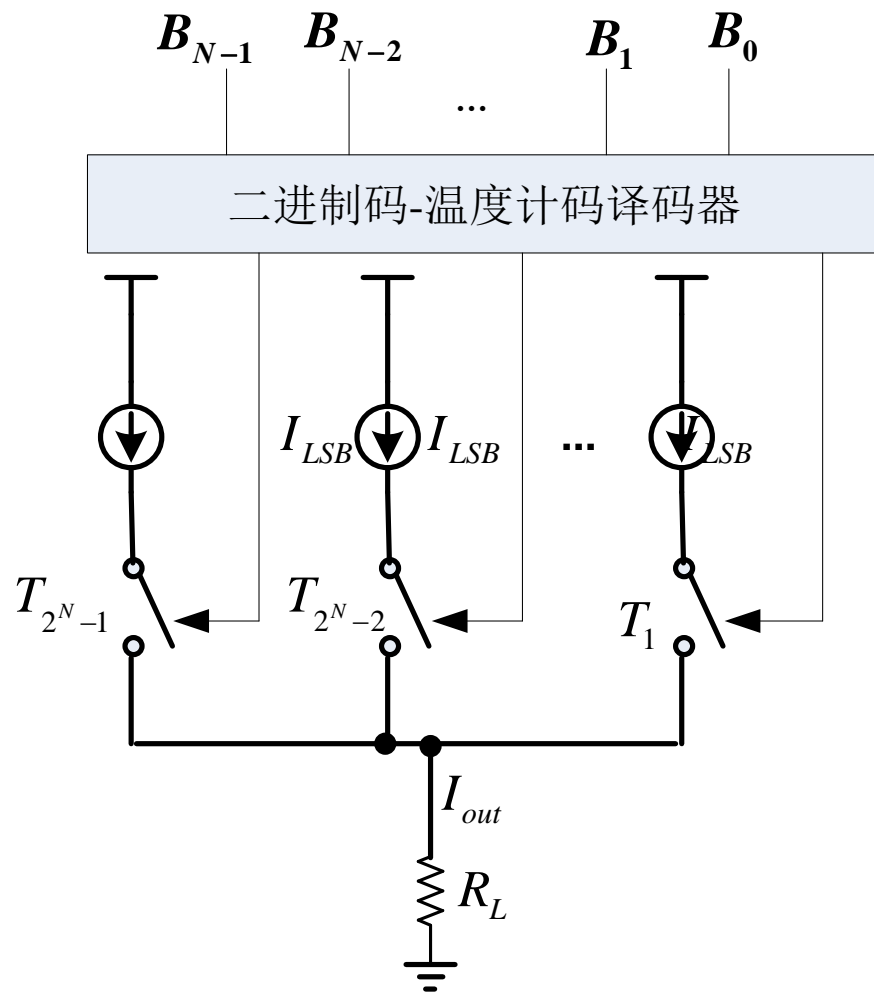
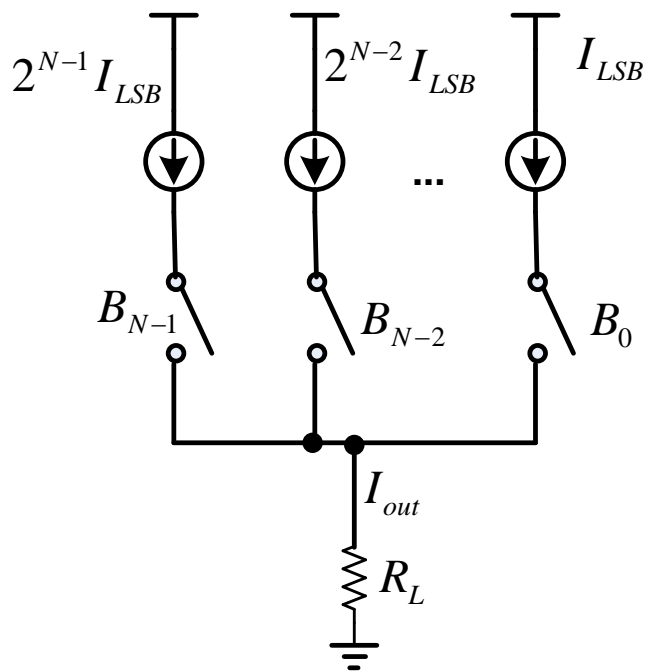


数模转换器电路

R-2R二进制电压权重型 DAC

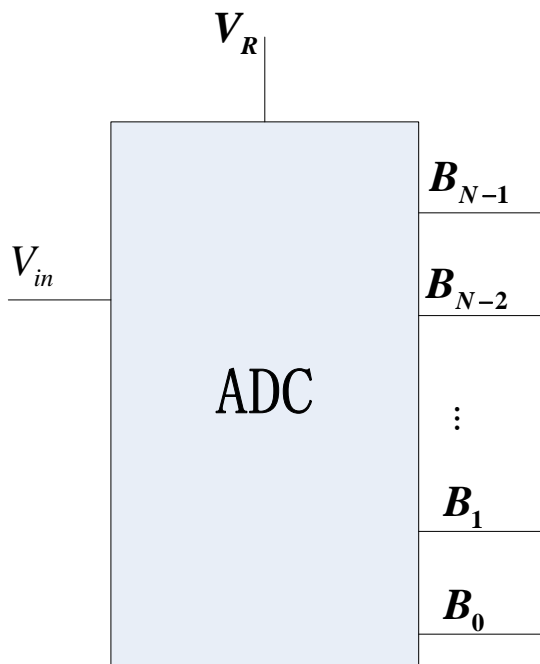


电流驱动型DAC

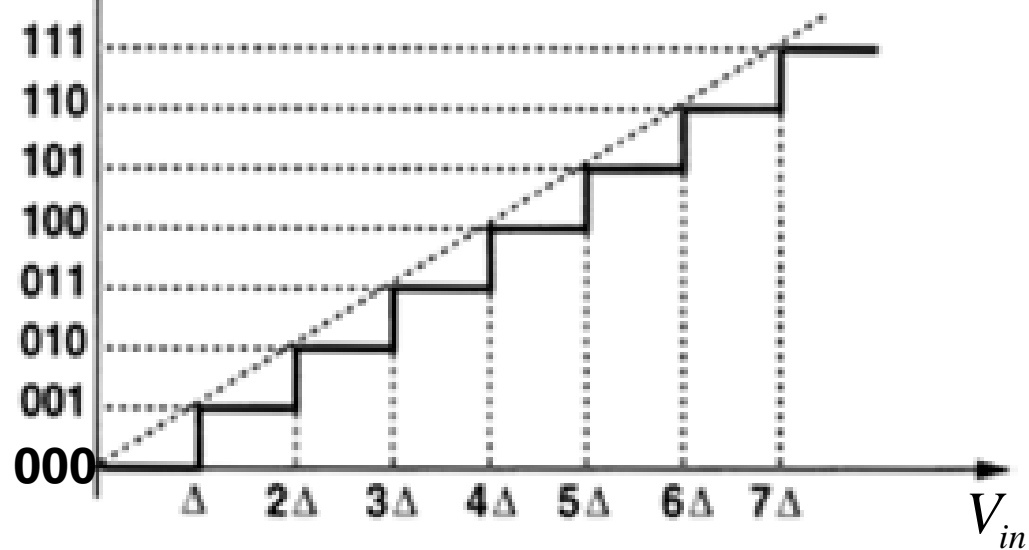


模数转换器

概述

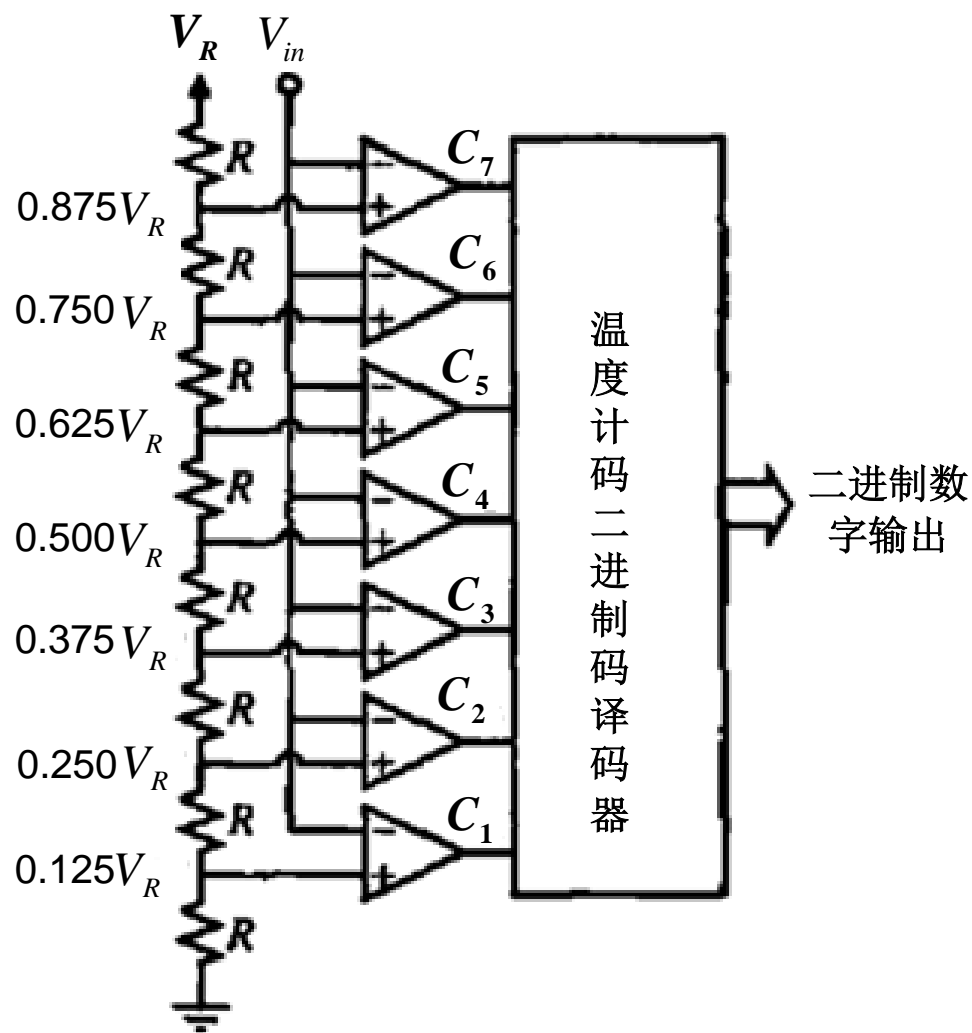


二进制数
字输出



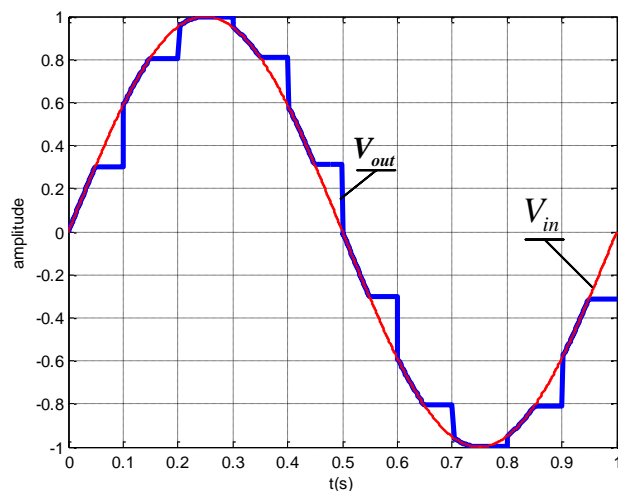
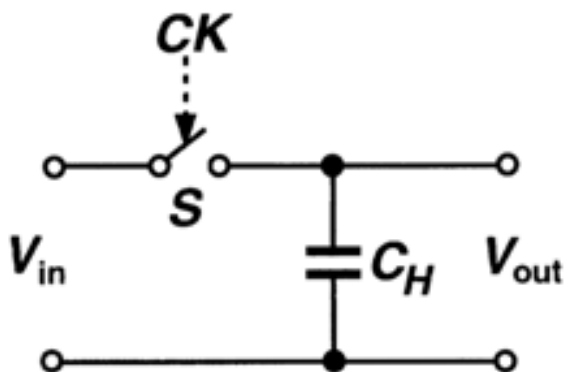
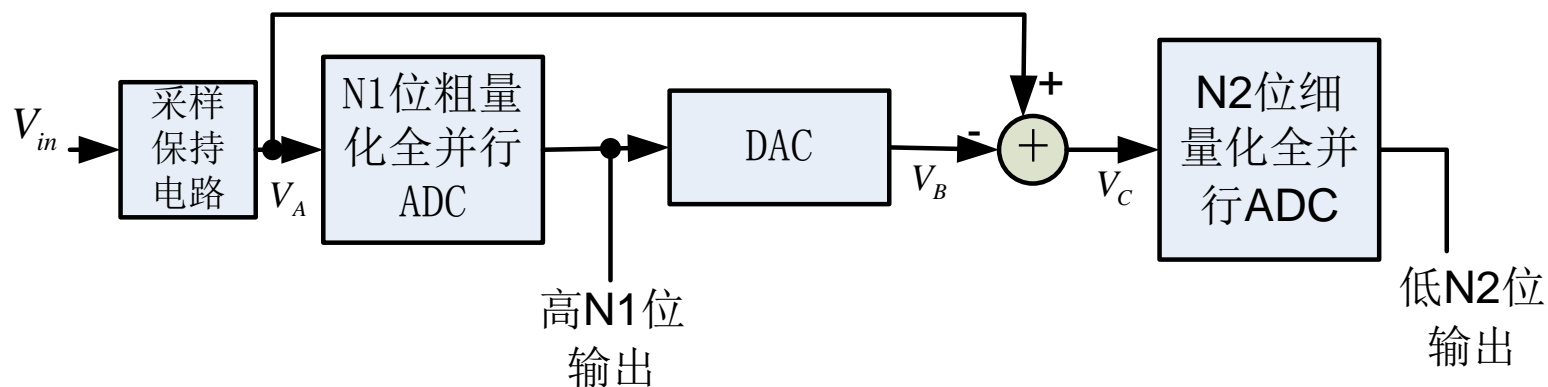
模数转换器电路

全并行ADC



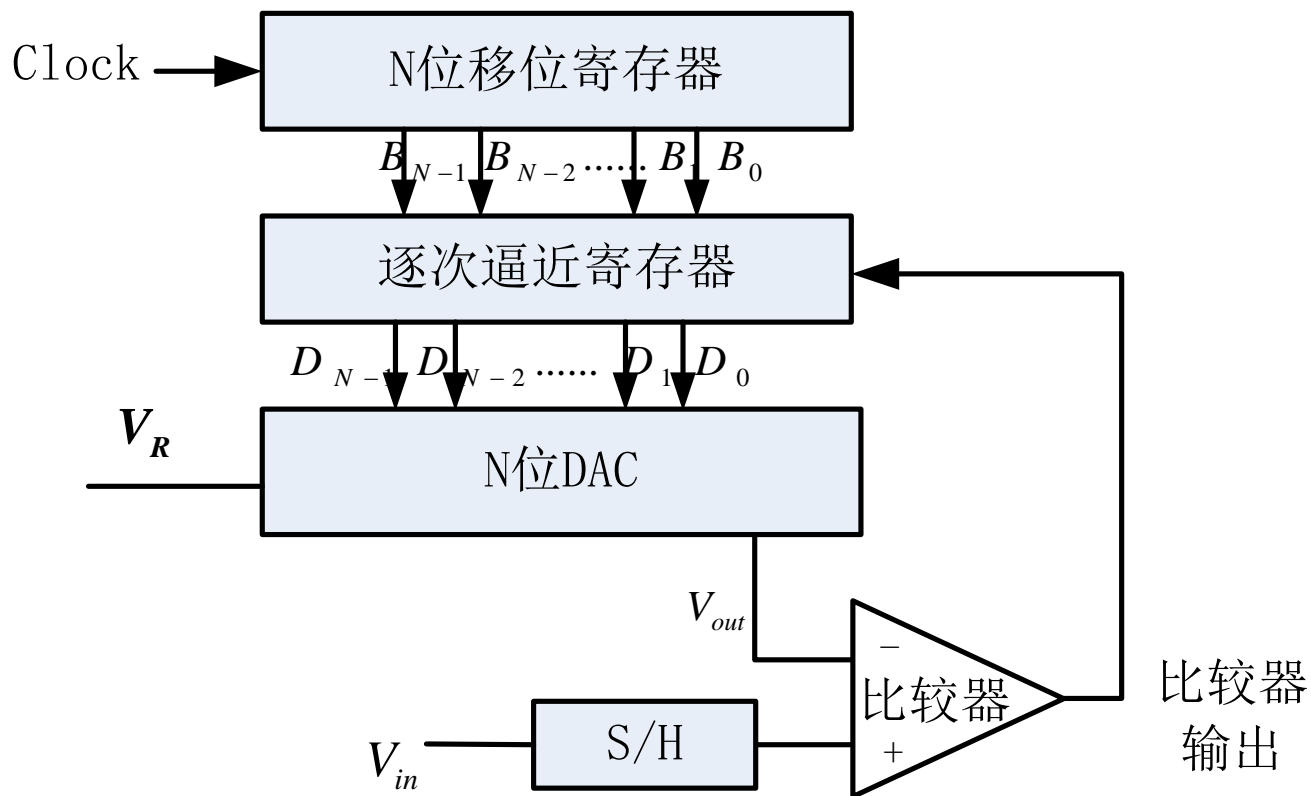
模数转换器电路

二步式ADC



模数转换器电路

逐次逼近ADC



VIP

ATL

Video Image Processing

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Thank you !