

Improving IBIS ECL Algorithms

改进 **IBIS ECL** 算法

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Content

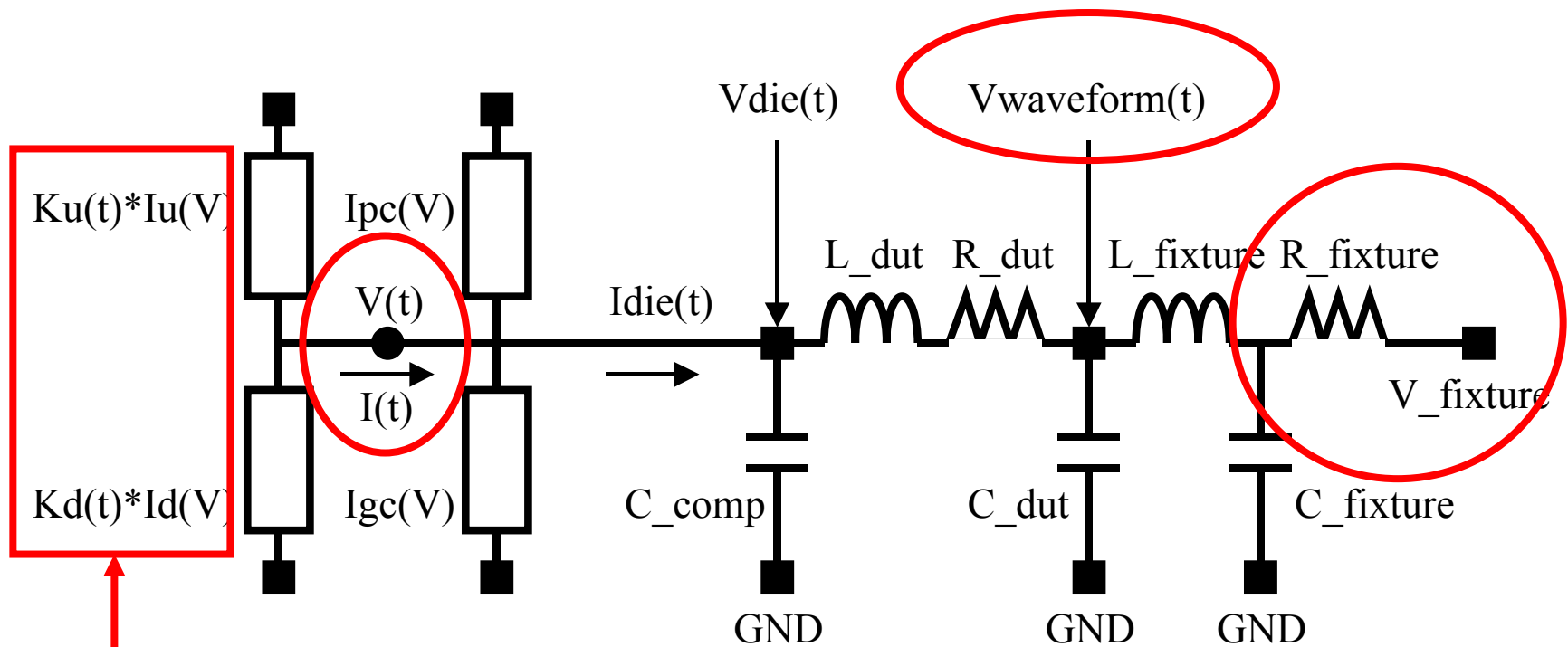
内容

- 2-Waveform Algorithm Overview
2- 信号波形算法概要
- ECL 2-Waveform Algorithm
ECL 2- 信号波形算法



2-Waveform K(t) Algorithm

2- 信号波形 $K(t)$ 算法



$K_u(t) * I_u(V)$

$I_{pc}(V)$

$V(t)$

$I(t)$

$K_d(t) * I_d(V)$

$I_{gc}(V)$

$I_{die}(t)$

$V_{die}(t)$

$V_{waveform}(t)$

L_{dut}

R_{dut}

$L_{fixture}$

$R_{fixture}$

$V_{fixture}$

C_{comp}

C_{dut}

$C_{fixture}$

GND

GND

GND

$$\begin{aligned} K_d(t)I_d(V_1) + K_u(t)I_u(V_1) &= -I_1(t) \\ K_d(t)I_d(V_2) + K_u(t)I_u(V_2) &= -I_2(t) \end{aligned}$$

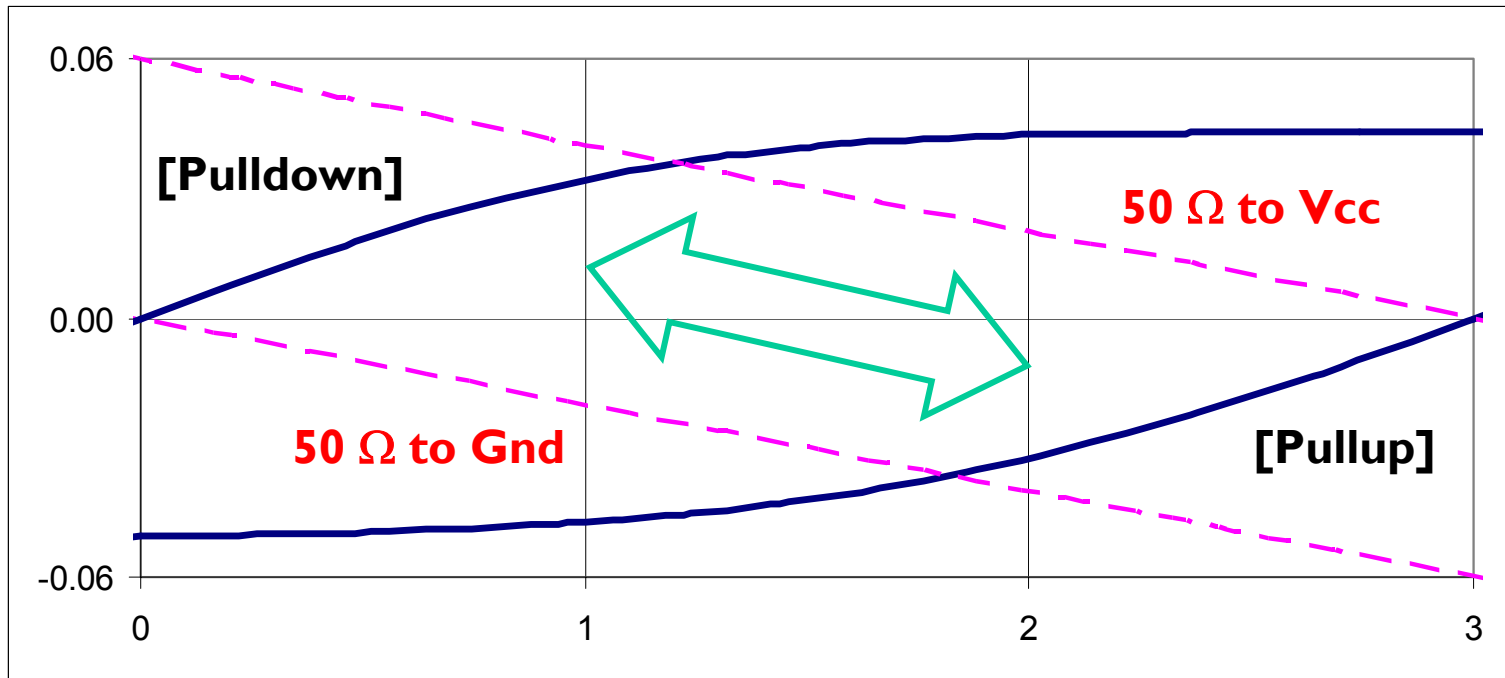
Recommended: 推荐

50 Ω to Vcc

50 Ω to Gnd

Example I-V Data

例子 I-V 数据



$$\begin{aligned} K_d(t)I_d(V_1) + K_u(t)I_u(V_1) &= -I_1(t) \\ K_d(t)I_d(V_2) + K_u(t)I_u(V_2) &= -I_2(t) \end{aligned}$$

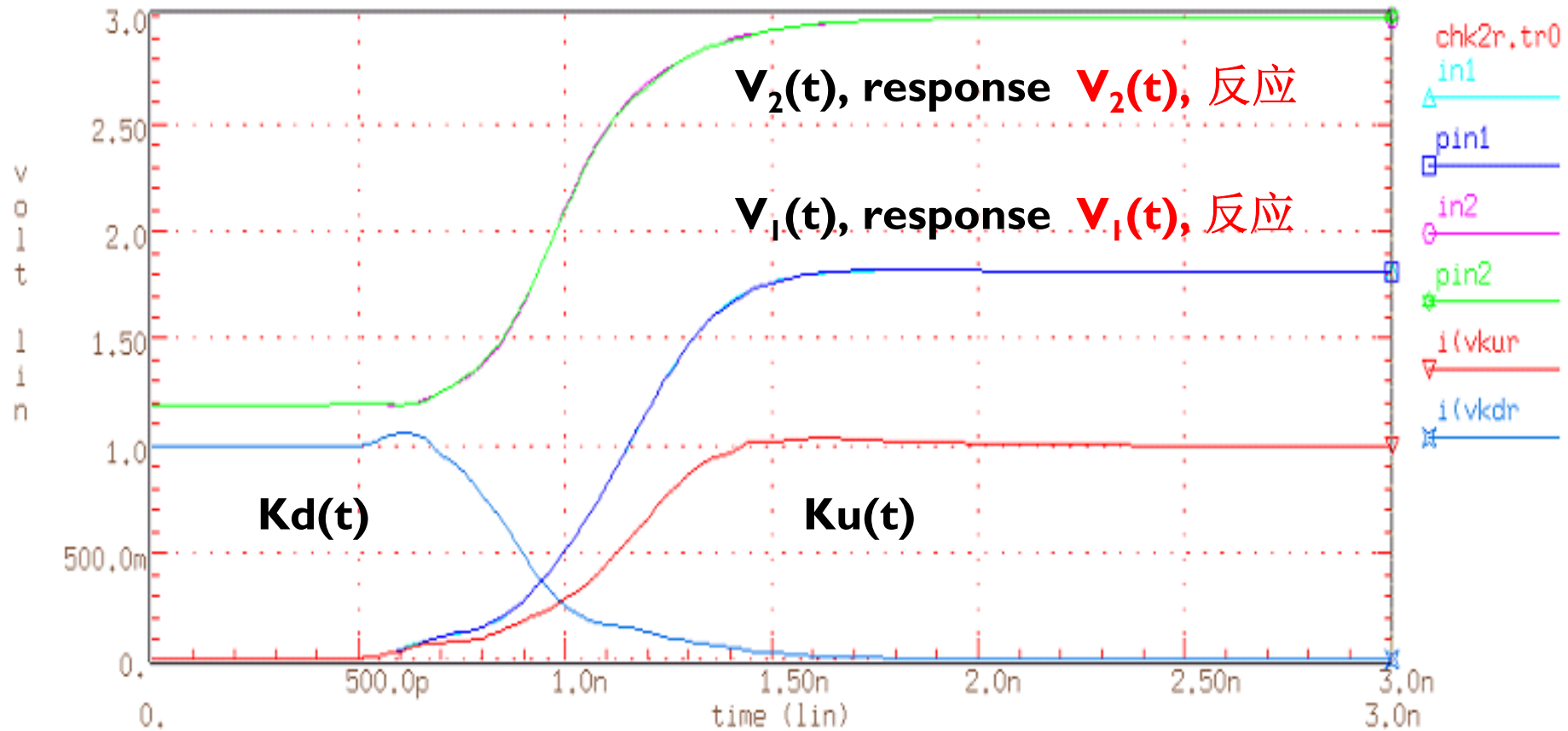
**K(t) solution exists
for fixture V**

K(t) 算法工作

Example V-T, K(t)

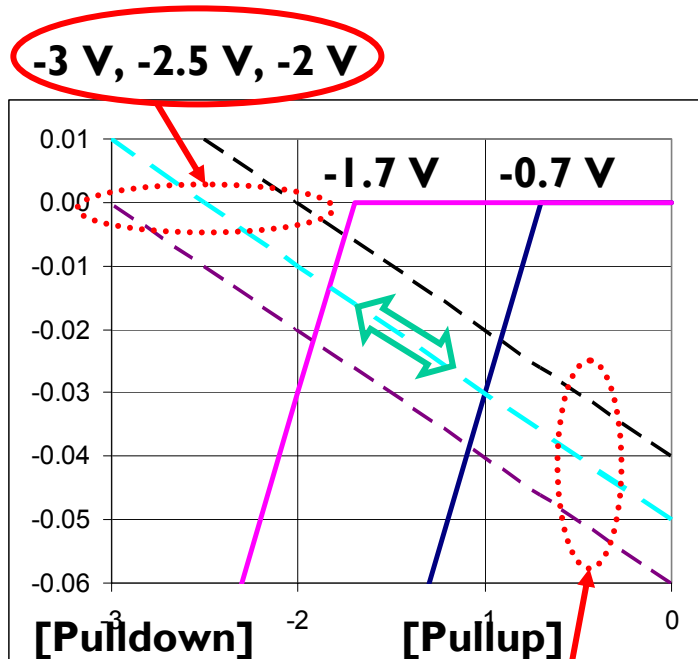
例子 V-T, K(t)

* check 2 waveform rising calibration
98/10/09 06:53:21



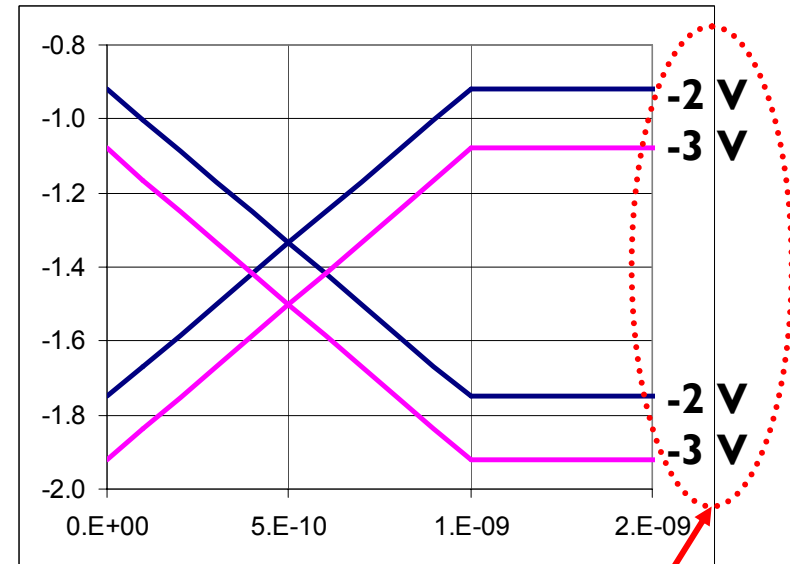
ECL 2-Waveform Data

ECL 2- 信号波形数据



ECL I-V Data

50 Ω loads



ECL V-T Data

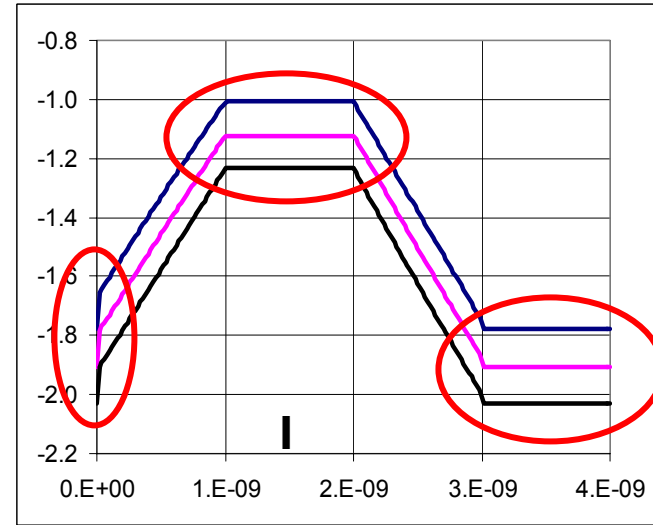
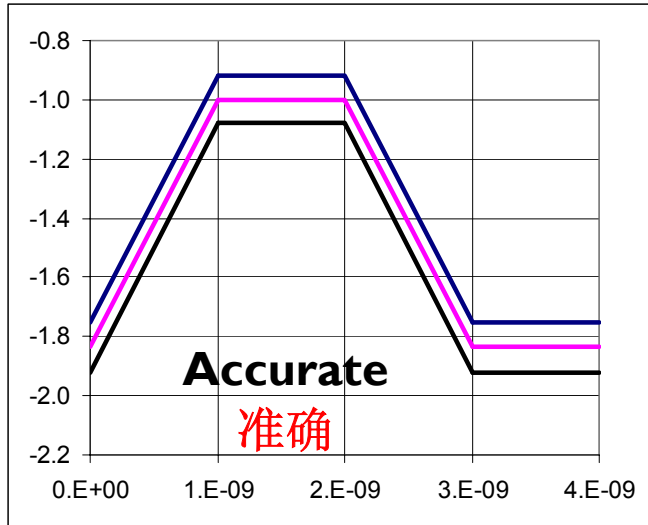
R_{fixure} = 50 Ω

V_{fixture} = -2 V, -3 V

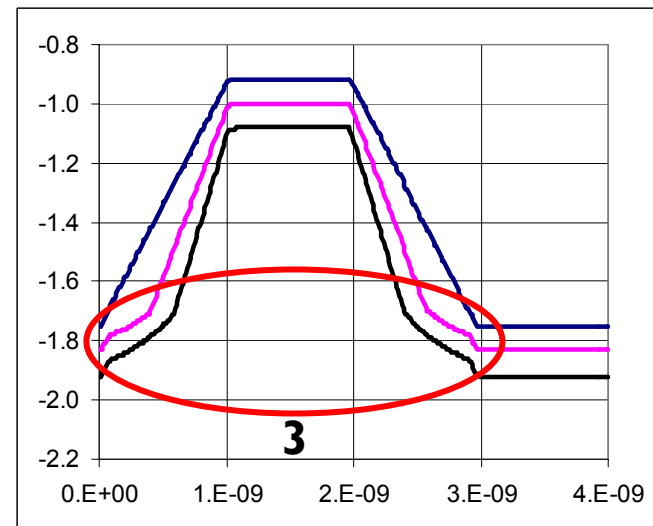
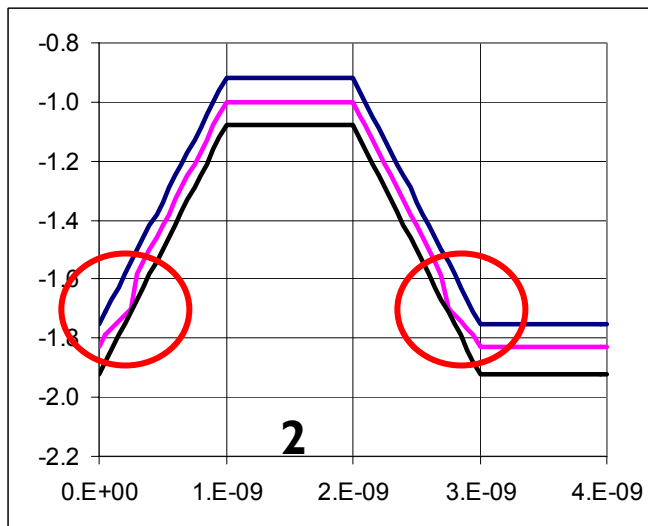
Example 例子

0-1-0 Calculation Errors

0-1-0 计算错误



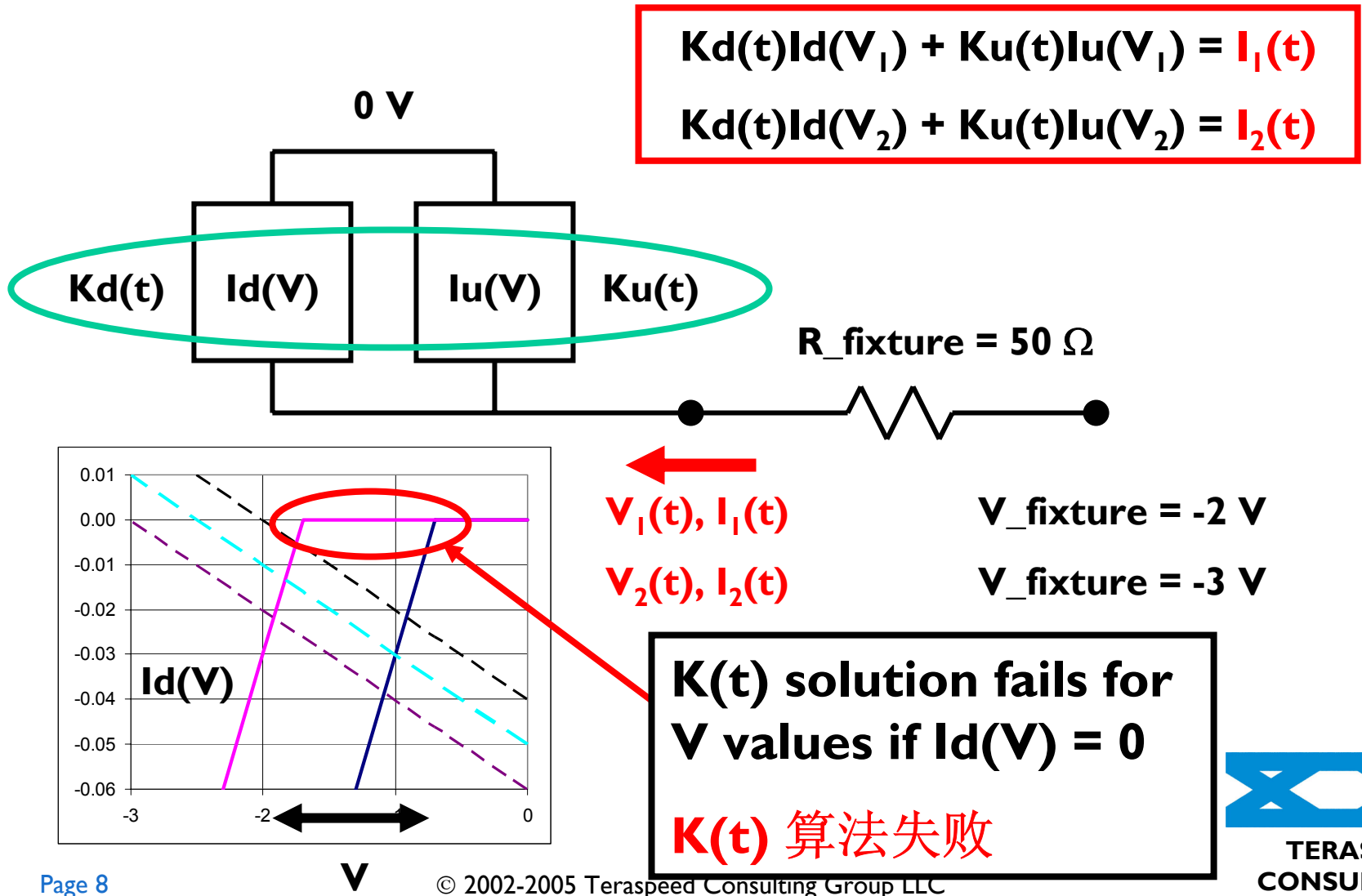
Wrong Shape
错误波形



Wrong Shape
错误波形

ECL K(t) Solution Fails

ECL K(t) 算法失败

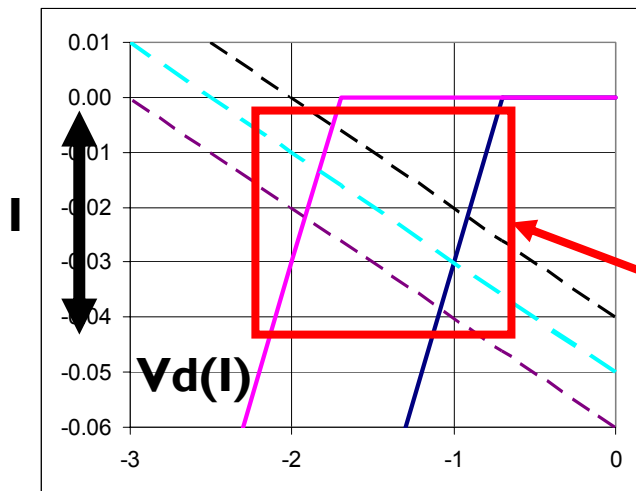
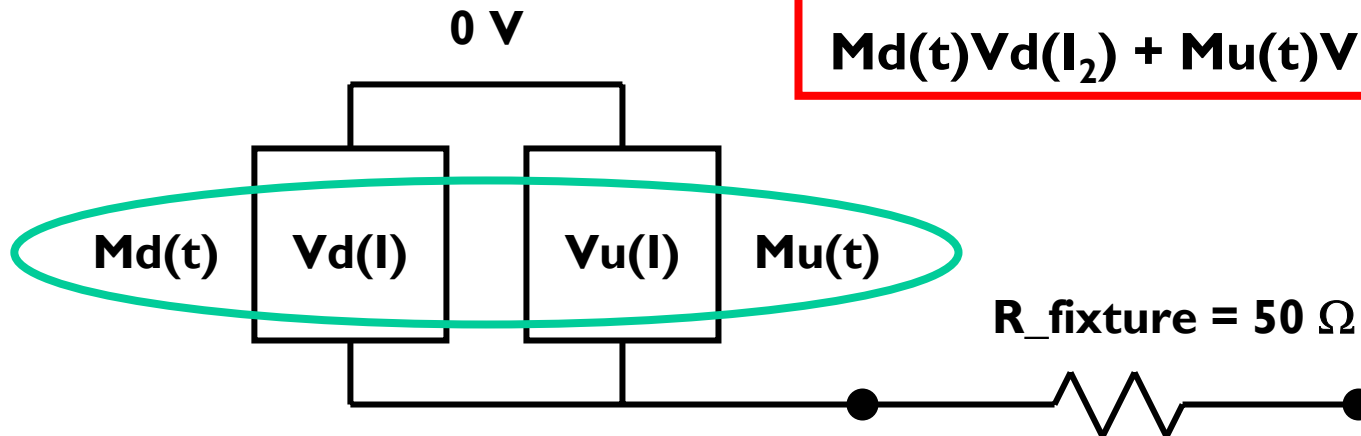


ECL M(t) Solution Exists

ECL M(t) 算法工作

$$M_d(t)V_d(I_1) + M_u(t)V_u(I_1) = V_1(t)$$

$$M_d(t)V_d(I_2) + M_u(t)V_u(I_2) = V_2(t)$$



$V_1(t), I_1(t)$

$V_2(t), I_2(t)$

$V_{\text{fixture}} = -2 \text{ V}$

$V_{\text{fixture}} = -3 \text{ V}$

**M(t) solution exists
for I values of Vd(I)**

M(t) 算法工作

ECL Improvement

ECL 改善

- Process 过程
 - Transform [Pullup], [Pulldown] data
变换 [Pullup], [Pulldown] 数据
 - From I-V 从 I-V
 - To V-I data 对 V-I 数据
 - Solve for $\mu(t)$, $M_d(t)$
发现解法为 $\mu(t)$, $M_d(t)$
- Advantages 好处
 - Supports 2-waveform analysis
支持 2- 信号波形分析
 - Avoids adjustments
避免调整



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