

2012 13th Biennial Baltic Electronics Conference

***Design and evaluation of a stroboscopic
signal converter based on discrete transistor
clocked comparator***

Nikolajs Agafonovs and Gatis Šūpols



IEGULDĪJUMS TAVĀ NĀKOTNĒ



EIROPAS SAVIENĪBA

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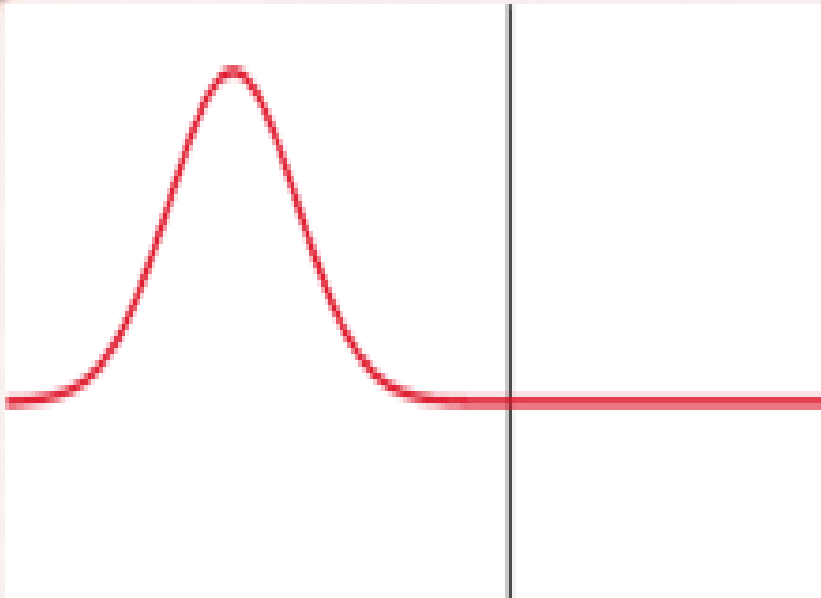
Background of work

Ground penetrating radar

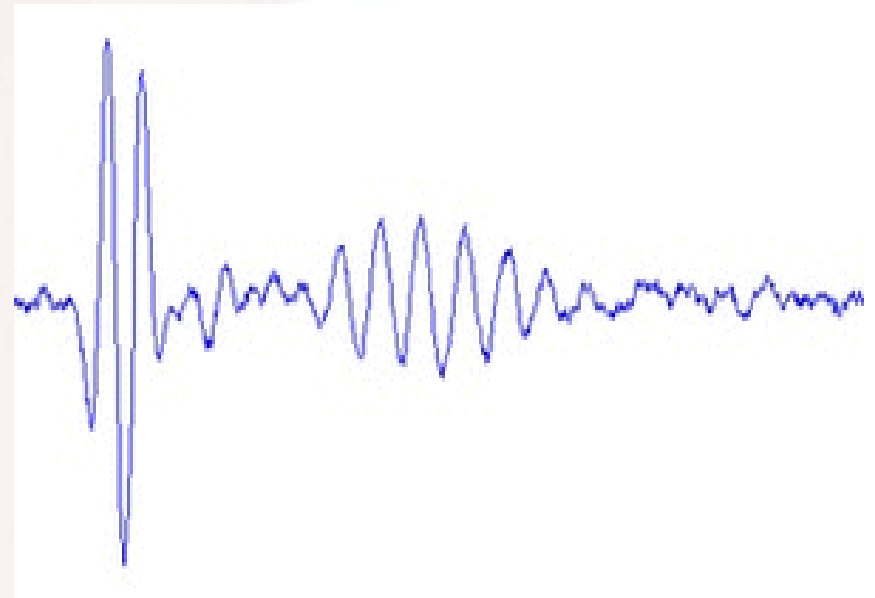


Background of work

Signal waveforms



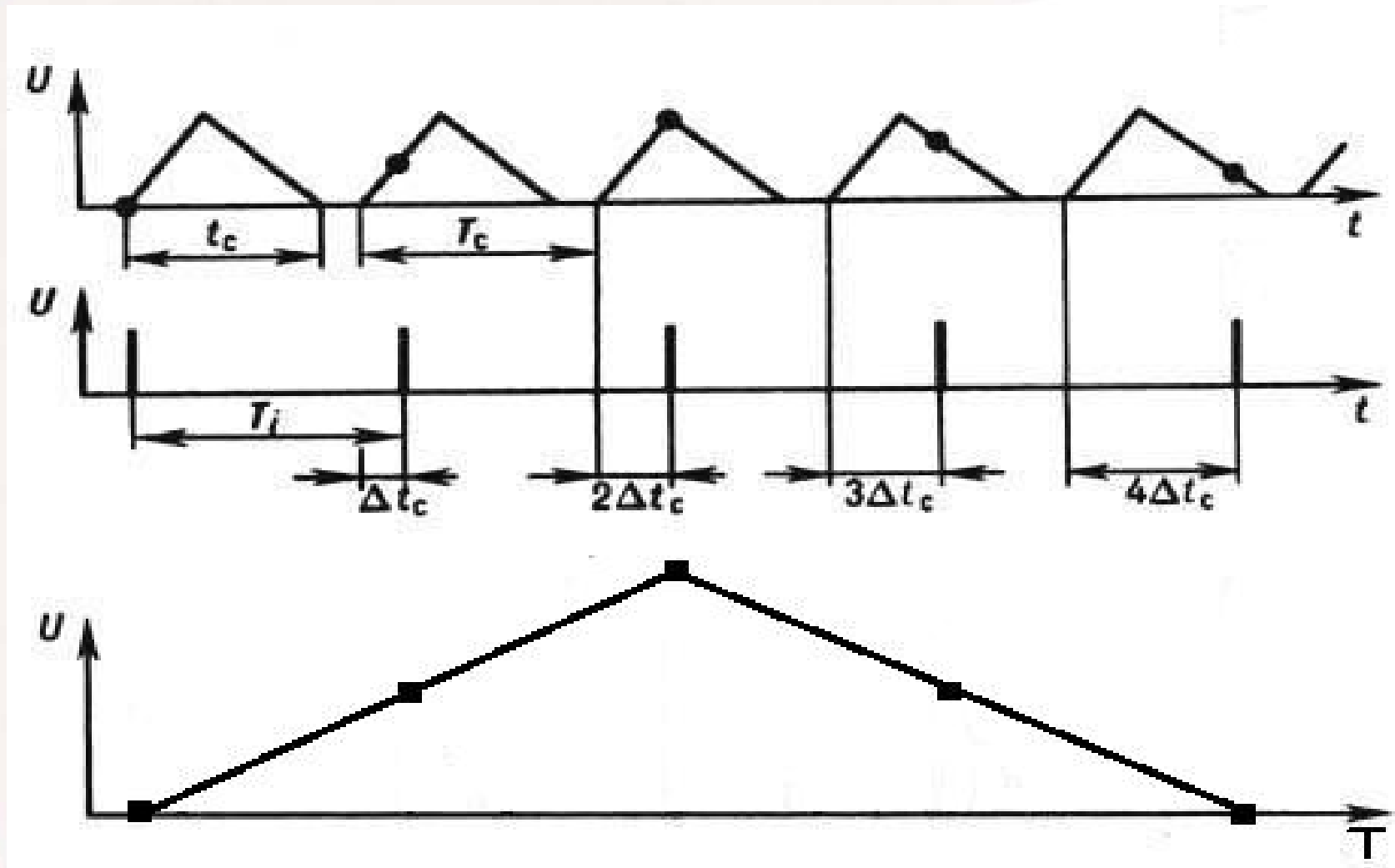
Ideal reflection from object



Real reflection from object

Background of work

Stroboscopic (time domain) conversion



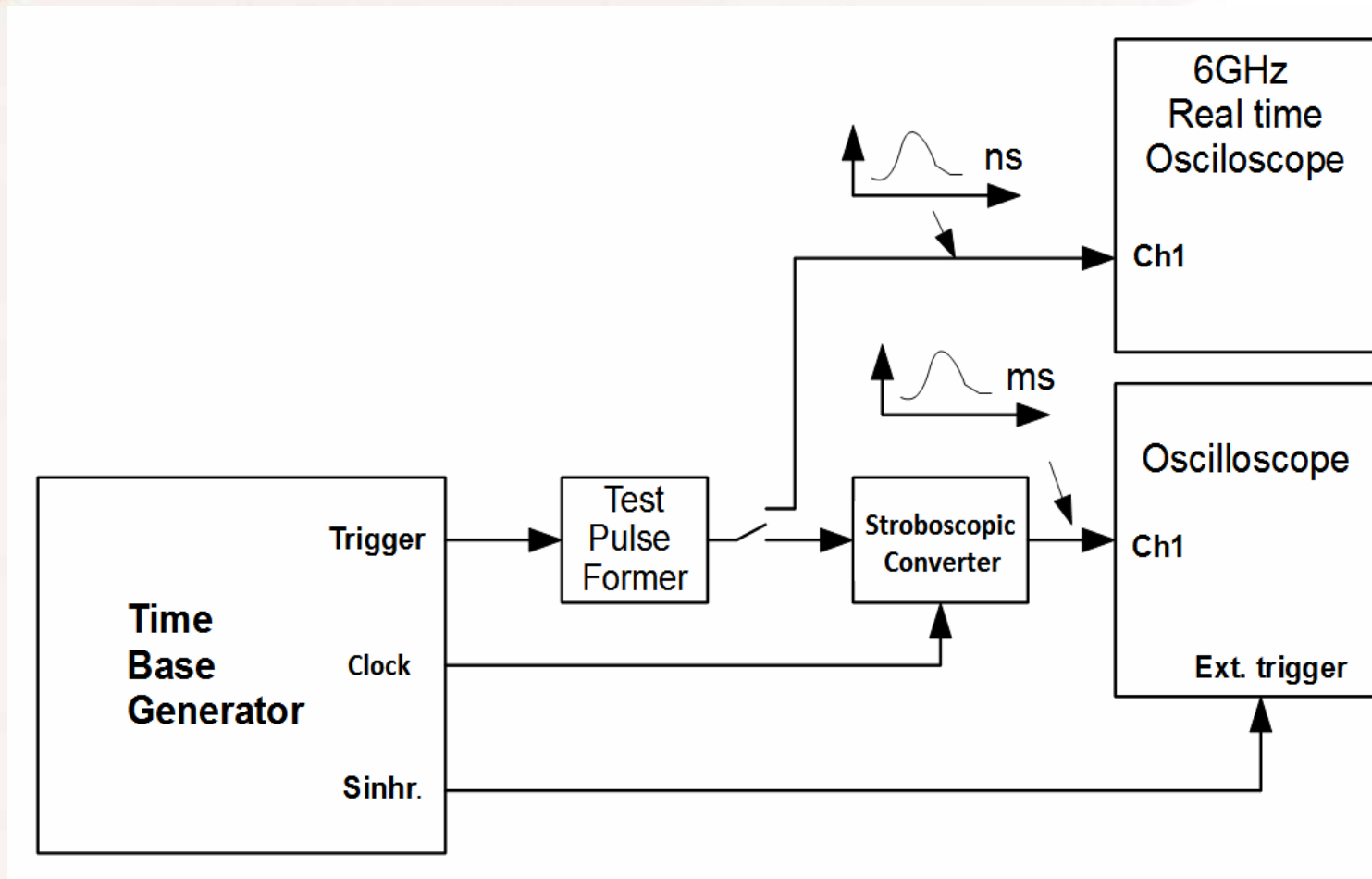
Goals of publication

Measured parameters of signal converter:

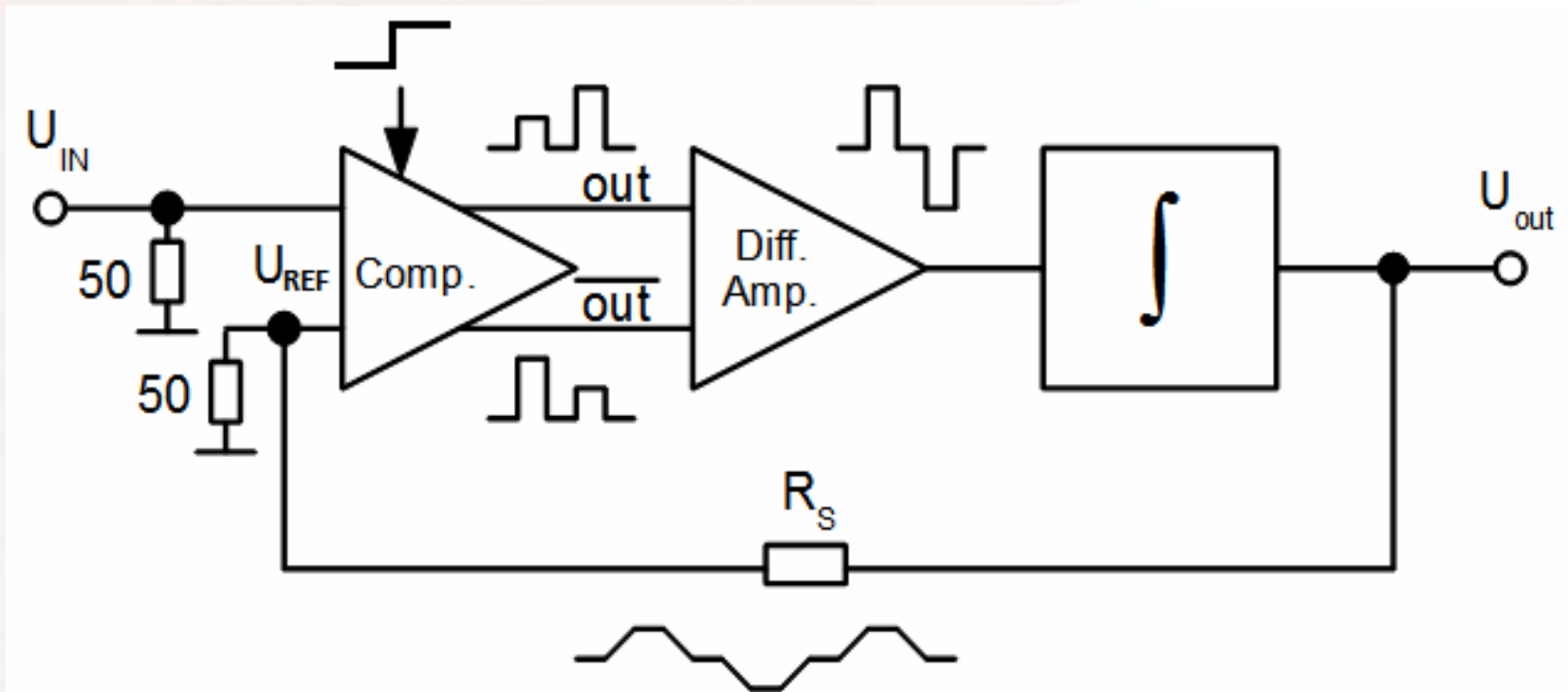
- Impulse response
- Linearity
- Bandwidth



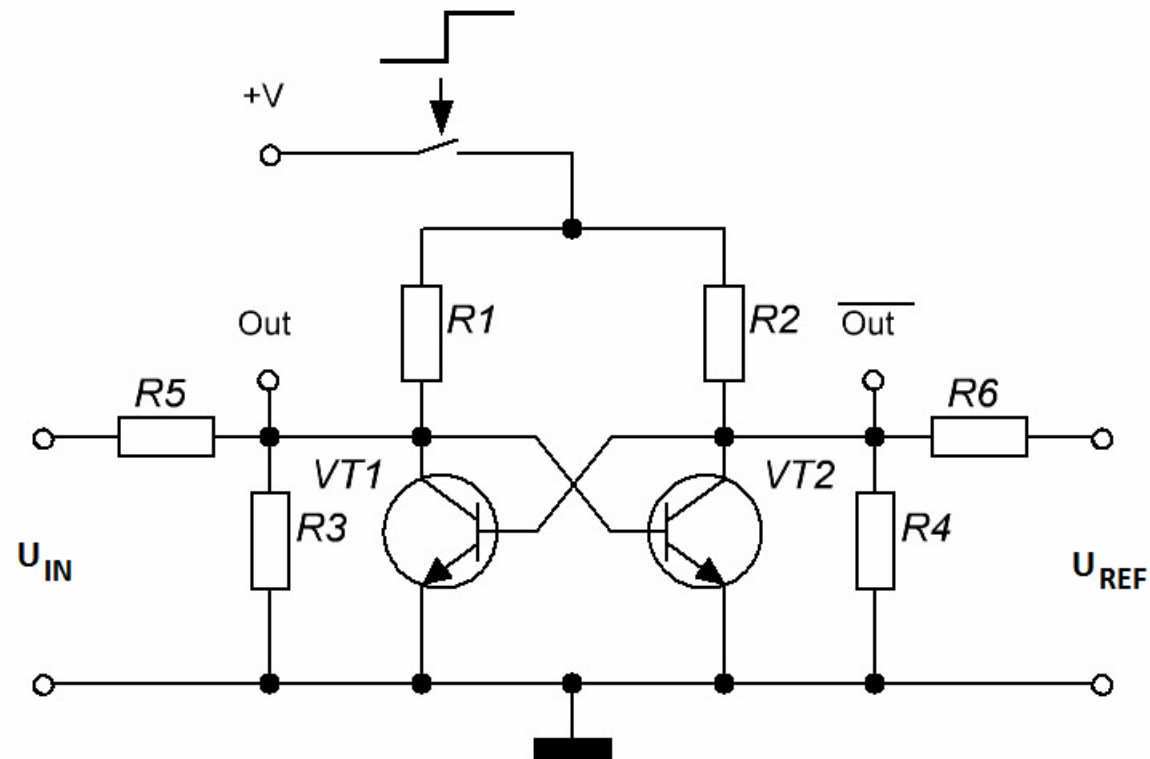
Test setup



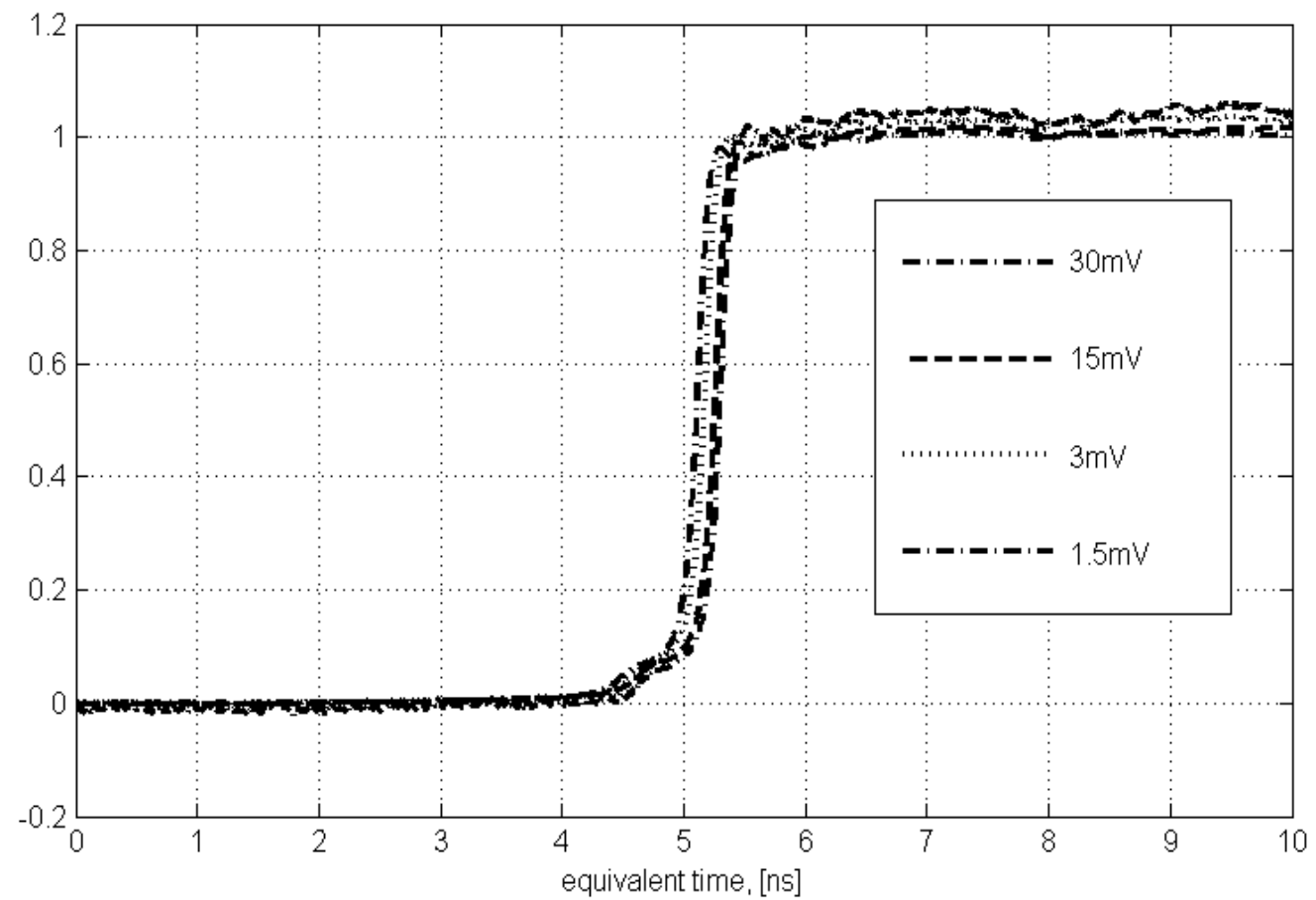
Stroboscopic signal converter



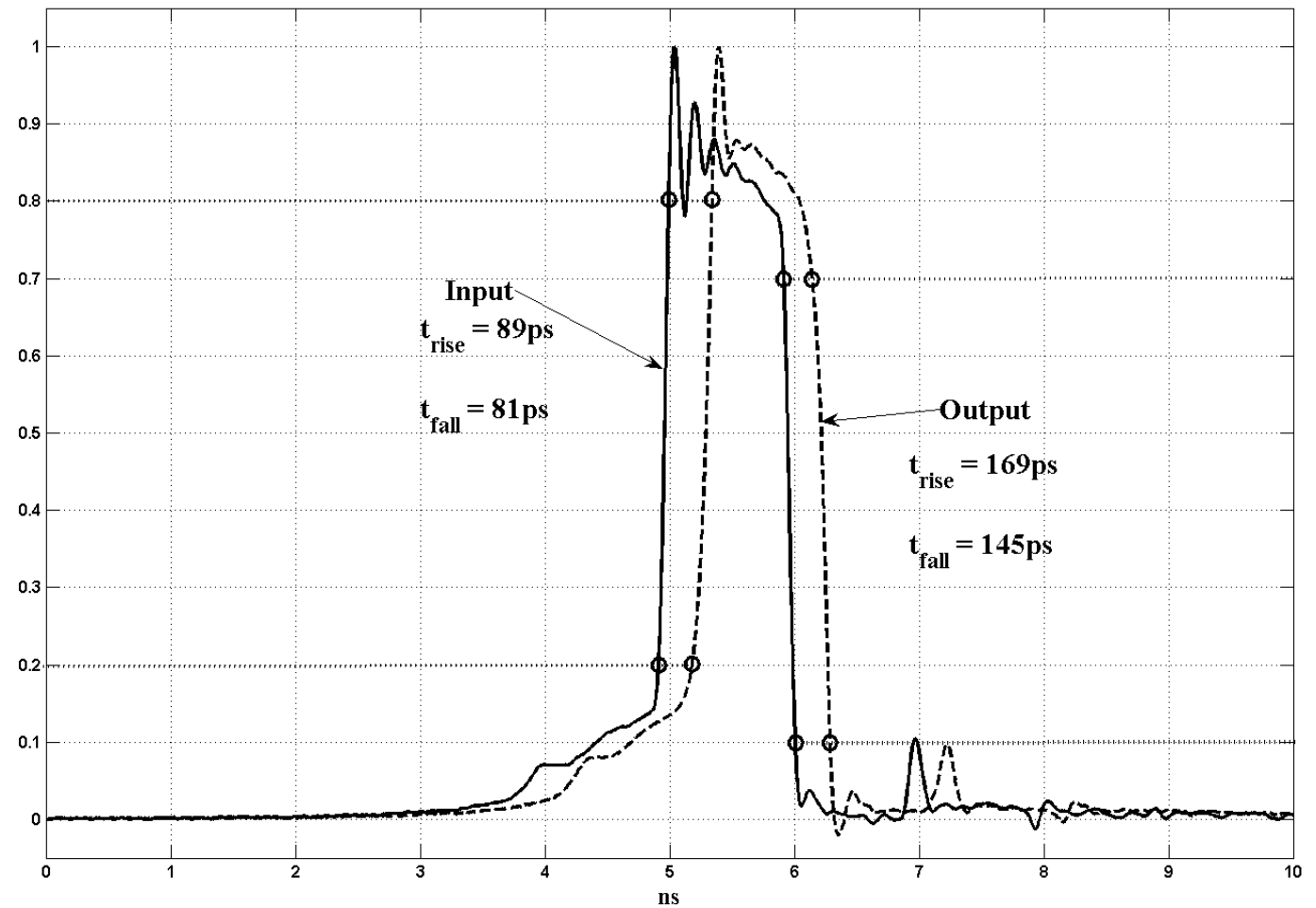
Balance type clocked comparator



Linearity test



Impulse response



Bandwidth measurement

Deconvolution method usage

$$y(t) = x(t) * h(t) = \int_{-\infty}^{+\infty} h(t - \tau)x(\tau)d\tau$$

$$Y(j\omega) = X(j\omega) \cdot H(j\omega)$$

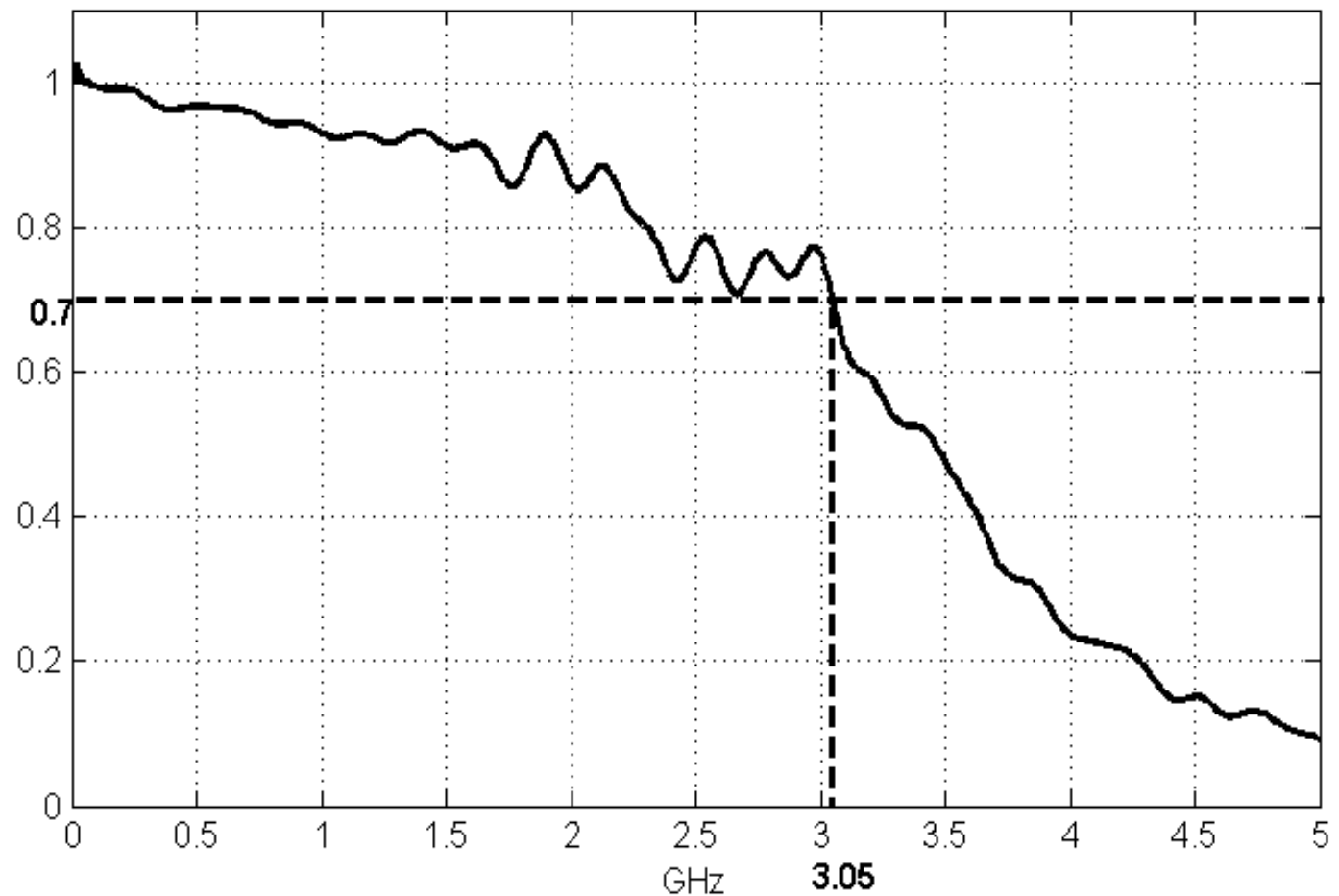
$$H(j\omega) = Y(j\omega)/X(j\omega)$$

$$H(j\omega) = \frac{1}{1 + \frac{\lambda}{|X(j\omega)|^2}} \cdot \frac{Y(j\omega)}{X(j\omega)}$$



Bandwidth measurement

Calculation result using deconvolution



Future work

- Implement in IC
- Measure sensitivity
- Measure maximal amplitude conversion range
- Express mathematically used copmarator internal operation



Thank you!

Questions?

