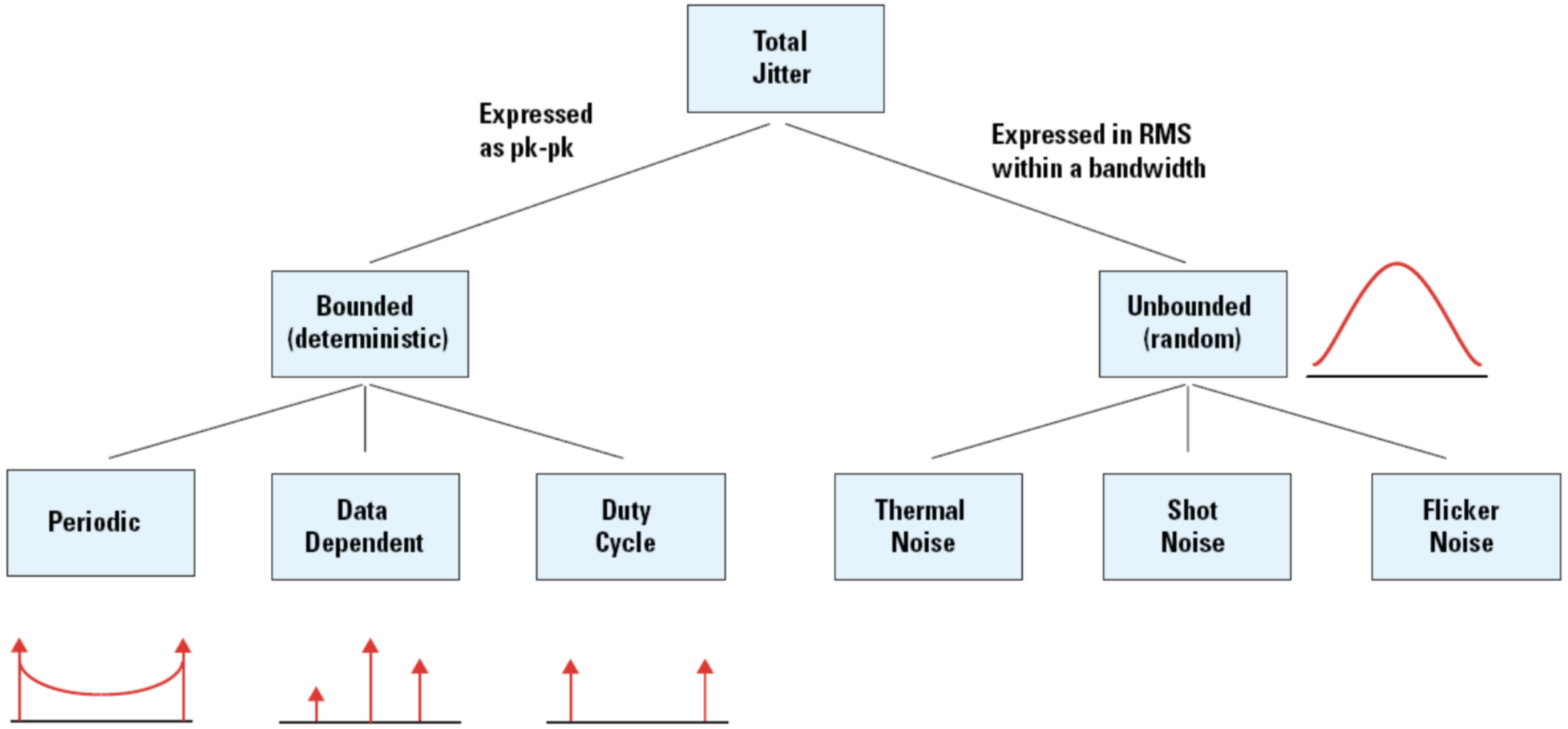
Clock Jitter

TI Precision Labs –Noise in Clock and Timing Systems

Presented by Rob Rodrigues

Prepared by Dinesh Jain

Clock jitter tree

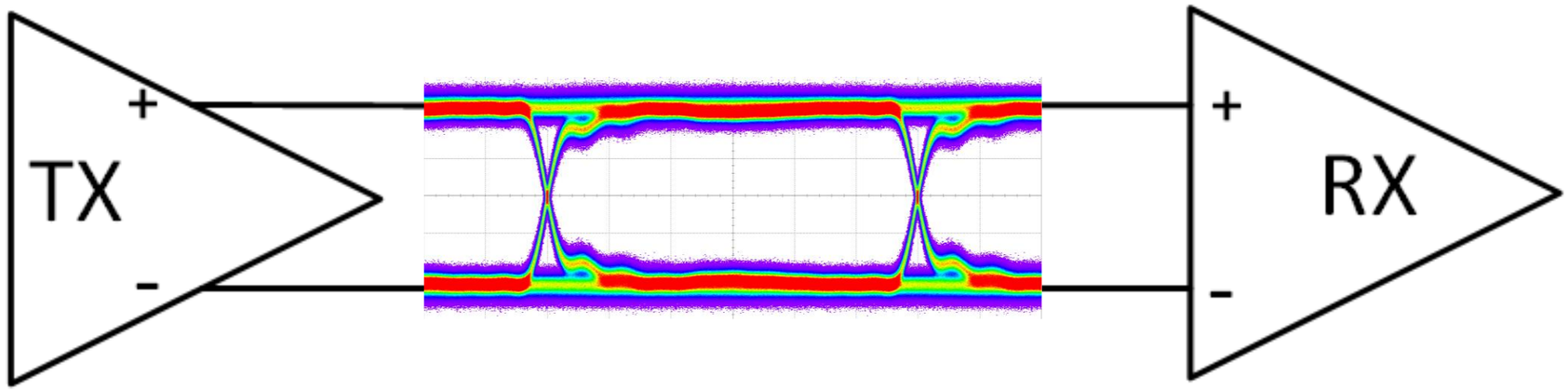


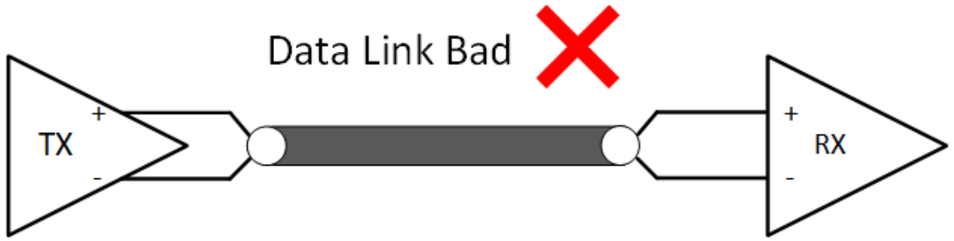
Converting RMS jitter into pk-pk & vice versa

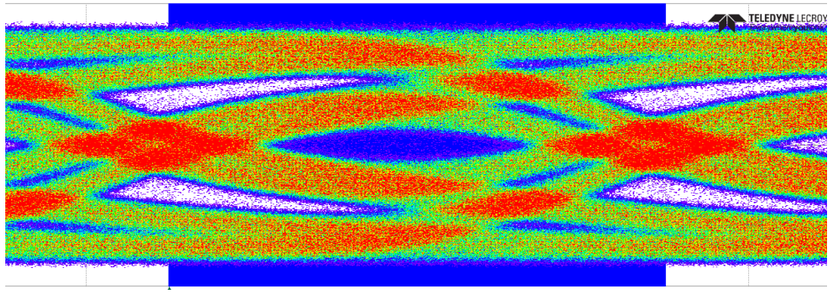
- For non-correlated noise source, a gaussian noise model is assumed.
- Bit Error Rate (BER) is defined as the number of erroneous bits in unit time interval.
- For correlated noise source, peak-peak Jitter is linearly added.

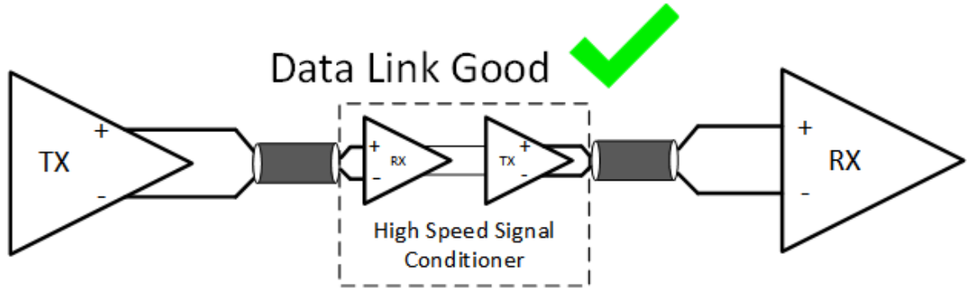
BER	Multiplier (Alpha)
10^{-9}	11.996
10^{-10}	12.723
10^{-11}	13.412
10^{-12}	14.069
10^{-13}	14.698
10^{-14}	15.301
10^{-15}	15.883

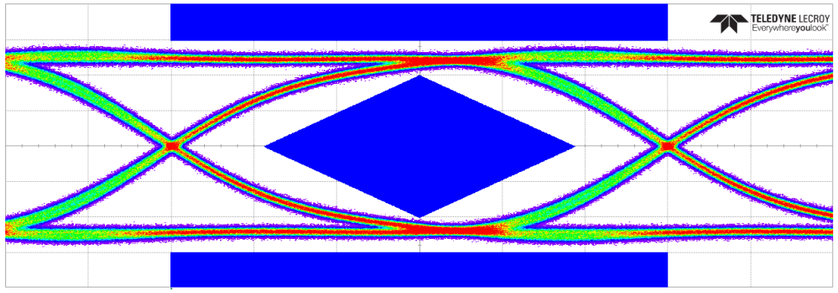
Impact of clock jitter in serial data communication



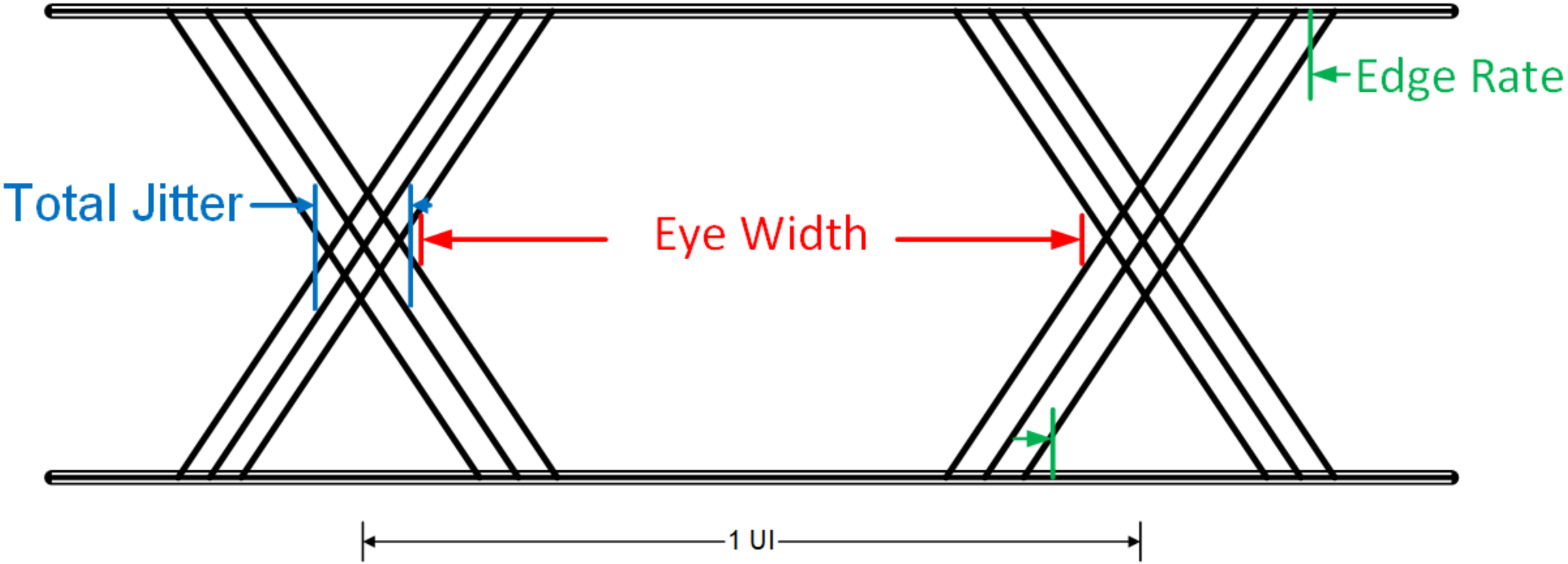




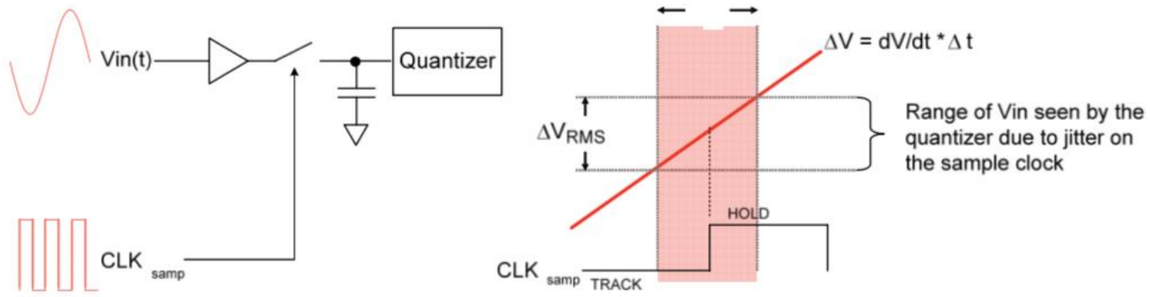


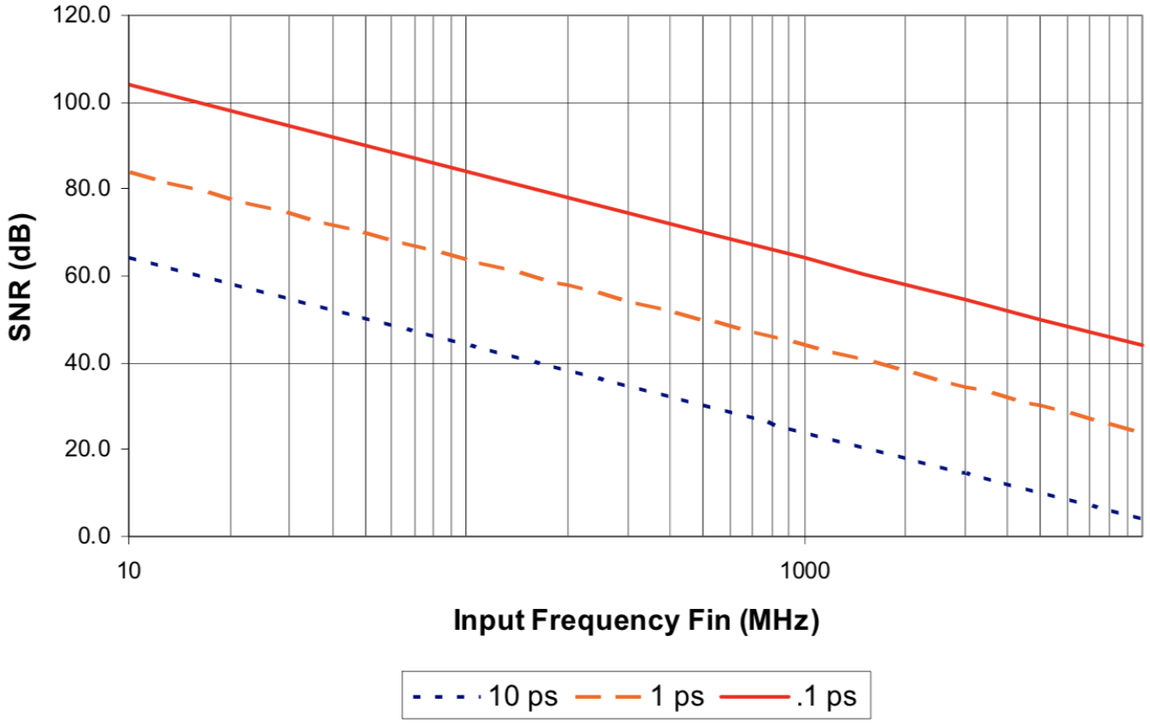


Eye diagrams measurements



Impact of clock jitter in ADC





$$SNR_{jitter} = 20\log_{10}\left[\frac{1}{2\pi f_{max}\sigma}\right]$$

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Clock Jitter Quiz

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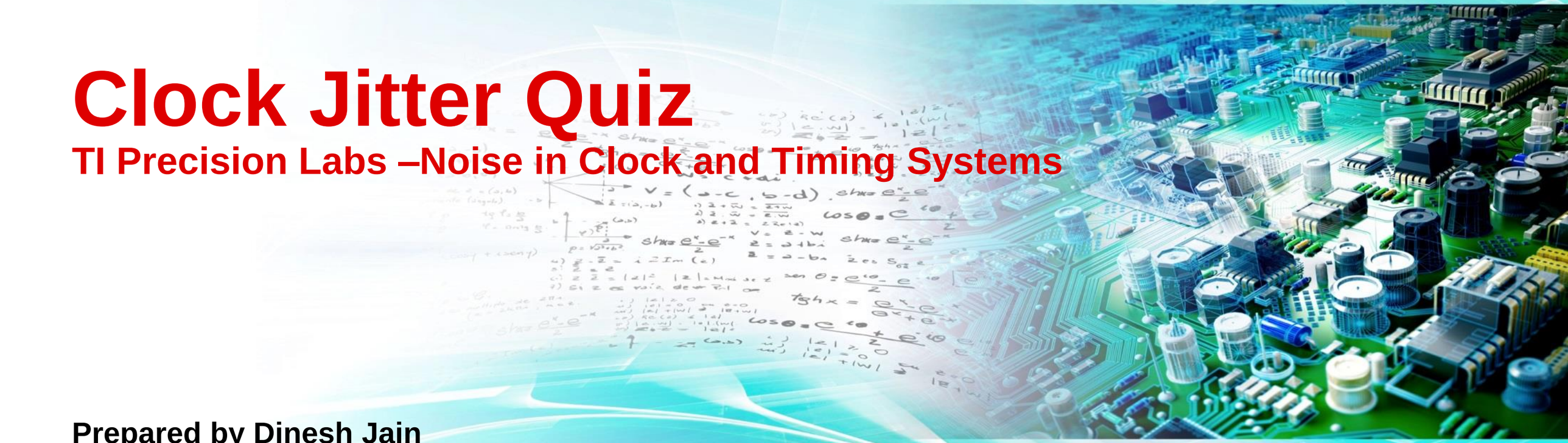

Prepared by Dinesh Jain

Short quiz

1. True or false: Random jitter is unbounded.

2. True or false: Clock jitter is a long-term fluctuation of clock edges.

3. True or false: For un-correlated noise source, peak-peak jitter is added linearly.

4. True or false: An eye diagram can be used to observe clock jitter

5. True or false: SNR of an ADC can be limited by clock jitter

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