

# TDT7: Short Pulses on Transmission Lines

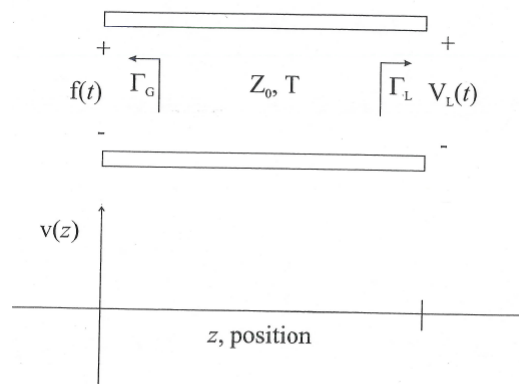
By Prof. Gregory D. Durgin

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## Basic Transmission Line

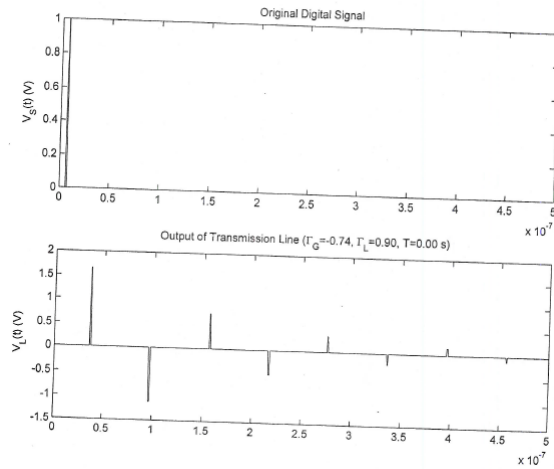
Finite Pulses on Transmission Lines



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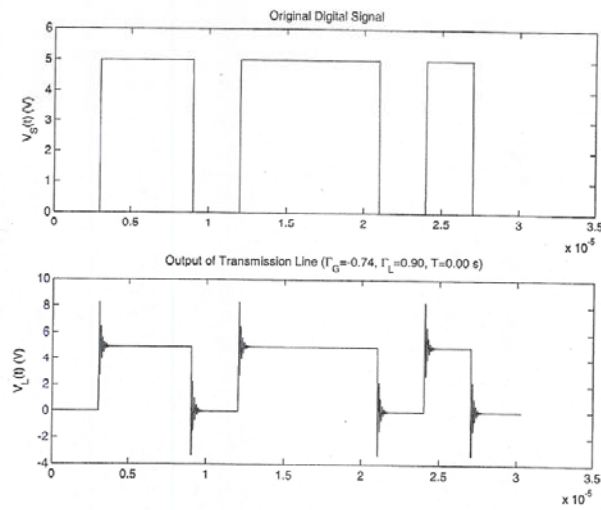
## Impulse Response



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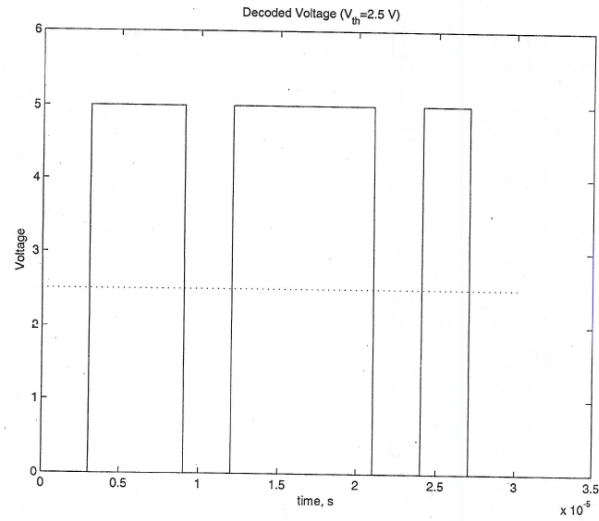
## Slow Data Signal



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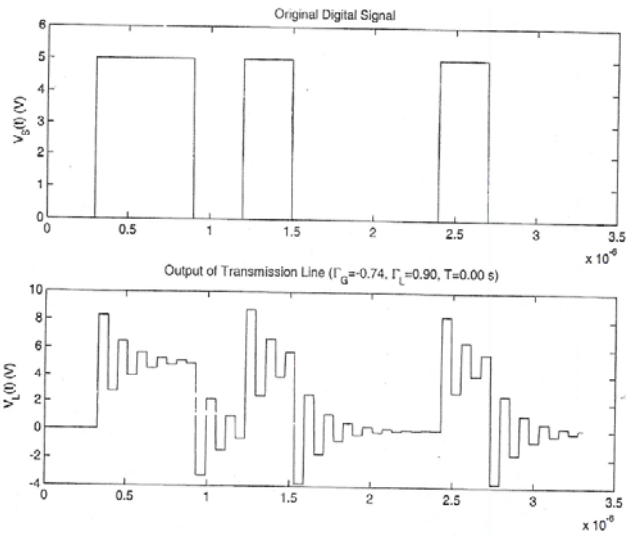
## Run through a Threshold Decoder



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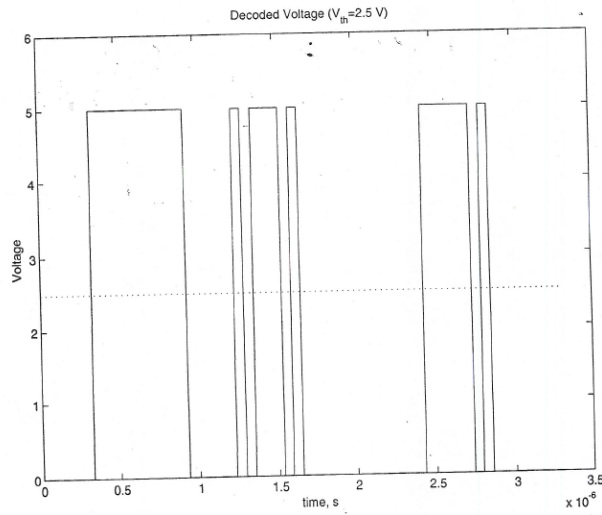
## Digital Signal with Moderate Bandwidth



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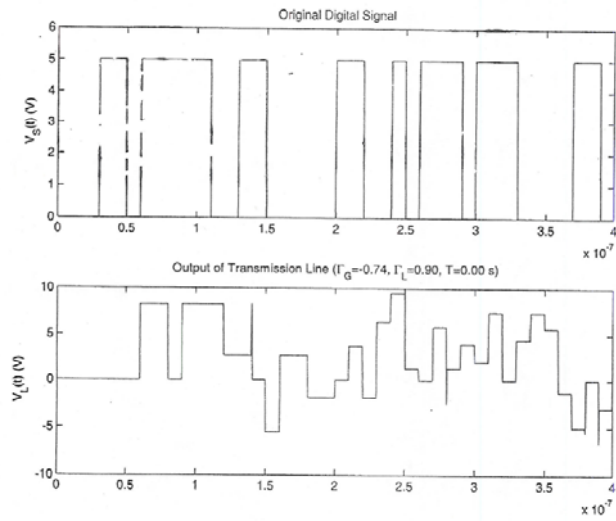
## Run through a Threshold Decoder



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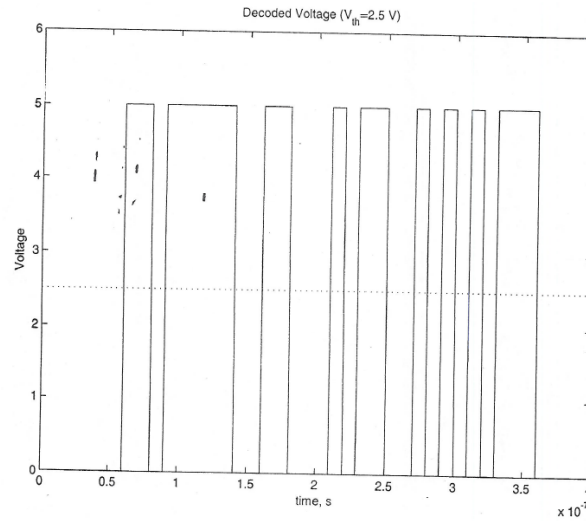
## Fast Data Signal



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## Run through a Threshold Decoder



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## Takeaways

- Very low-bandwidth signals can ignore transmission line effects
- Higher bandwidth signals must resort to equalization or clever decoding
- Examples:
  - Digital Subscriber Line (DSL) on telephone lines
  - Internet on cable TV lines
  - Cable/internet signals on power lines

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