Closer Look at Transfer Function Fix in COM 2.90

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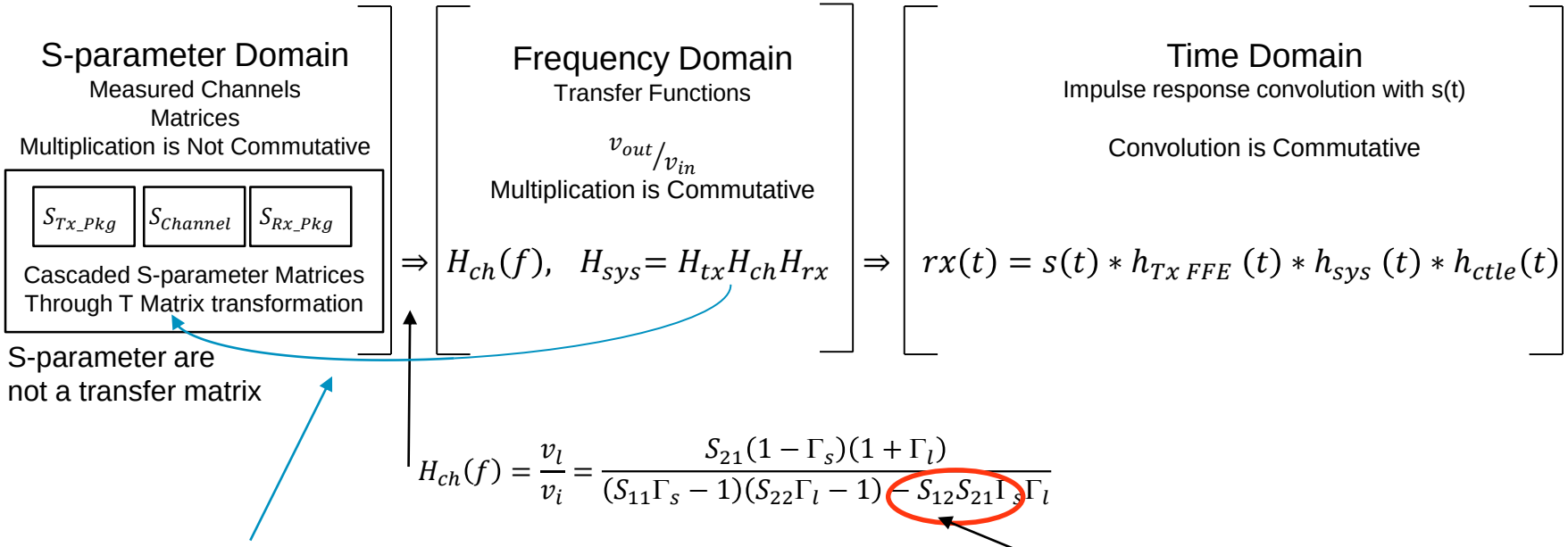
Introduction

- This presentation is in response to a request for more details on the voltage transfer function issue reported by Rich in *COM 2.93 Update*
  - http://www.ieee802.org/3/ck/public/adhoc/may20_20/mellitz_3ck_adhoc_01a_052020.pdf

- The issue was found when investigating 112G XSR channels with different Rdie settings.
  - Behavior of results from COM tool did not match ADS nor an in house simulator when Rdie was not 50 ohms
  - The SBR's did not match

With any of these tools we should be able to start with a common SBR for a given Die/Package/Channel configuration

Processing Domains within COM Tool

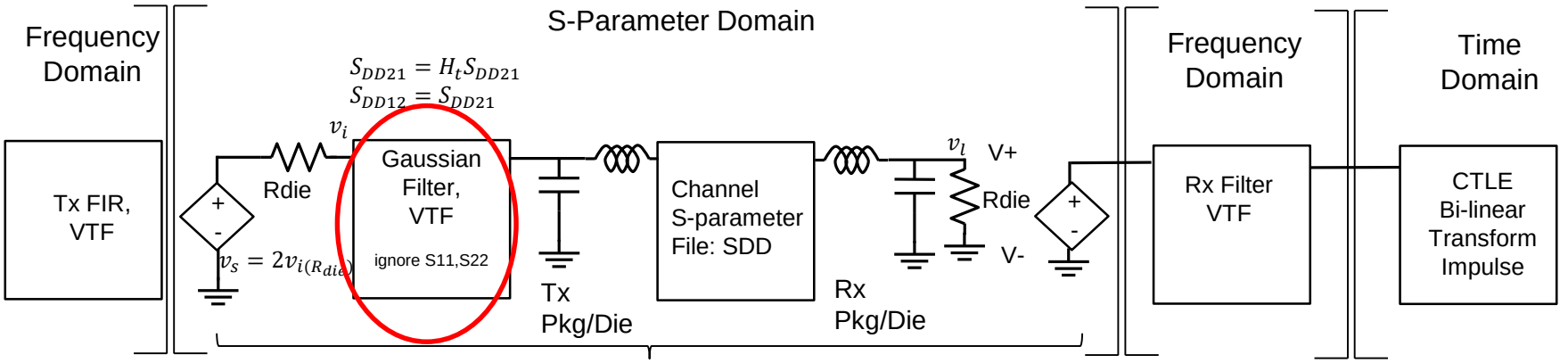


Can you put H_{tx} in S-parameter Domain: NO

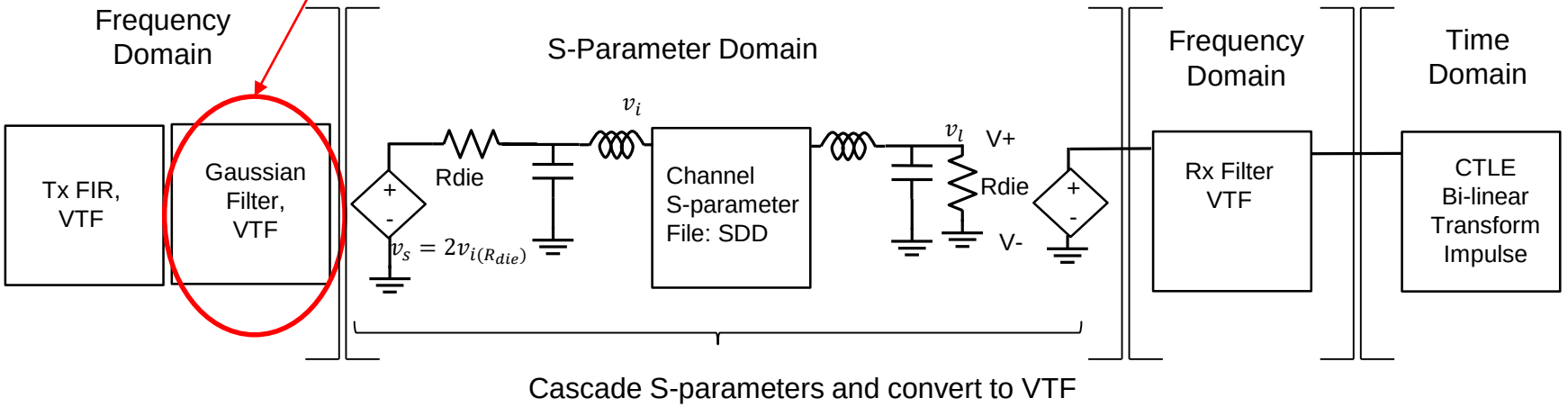
- Matrix multiplication is not commutative
- You do not multiply S-parameter matrices to cascade them
- Can not ignore S_{11} and S_{22}
- These blocks are sensitive to termination impedances
- It would need a full S-parameter matrix, not just S_{21}

What Happened in COM Tool

What COM tool did



The Fix

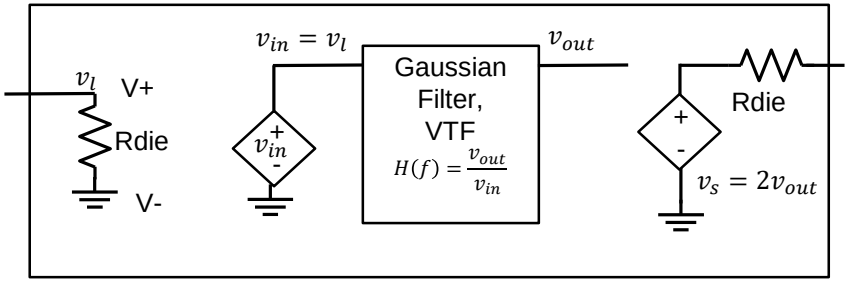


FYI: How to make the original code work

Say, in ADS….

Since we are using a Gaussian Filter VTF

- Need to create a “buffered” filter with VCVS
- Zin = Rdie, Zout = Rdie



- For a properly terminated buffer isolated system,
  S11 = Γ_s, S22 = Γ_l
  S21 = H_t (Gaussian Filter)
  S12 = 0

Thank you