ibisami – An open source, public domain IBIS-AMI model creation infrastructure

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Outline

- Introduction
- Highlights
- Limitations
- How to download/use?
- How to contribute?
- Sanity checking results
- Acknowledgments
- Q&A

Introduction

- Common boilerplate in all IBIS-AMI models.
  - No opportunity for competitive differentiation.
  - Wasted effort. Redundant maintenance.
  - Invites slight differences in “standard processing”.
- Why not a community resource?
- Enter *ibisami*…

Highlights

- Generic parameter parser.
- Tx FIR pre-emphasis template.
  - Parameterized, via tap weights.
- Rx CTLE template.
  - Parameterized, via peak location/magnitude.
- Rx impulse response can include approximation of DFE behavior.
- Single makefile for: Windows, Linux, and MacOS.

Limitations

- Init()-only; no GetWave().
- No time domain adaptation for CDR/DFE.
- Fixed number of poles/zeros in CTLE model; may not be accurate enough for some purposes.
- No modeling of saturation in Tx output driver, or CTLE final stage.

How to Download/Use?

- Visit the project's wiki page: https://github.com/capn-freako/ibisami/wiki
- Click on the *Getting Started* link.

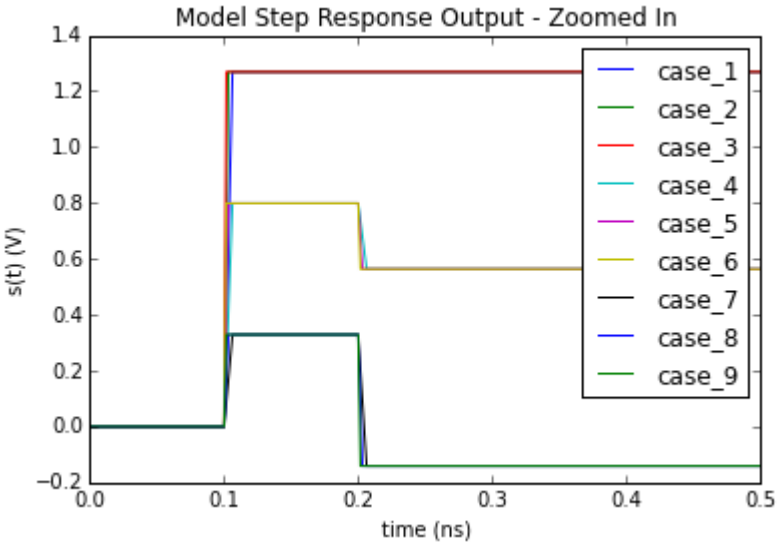
How to contribute?

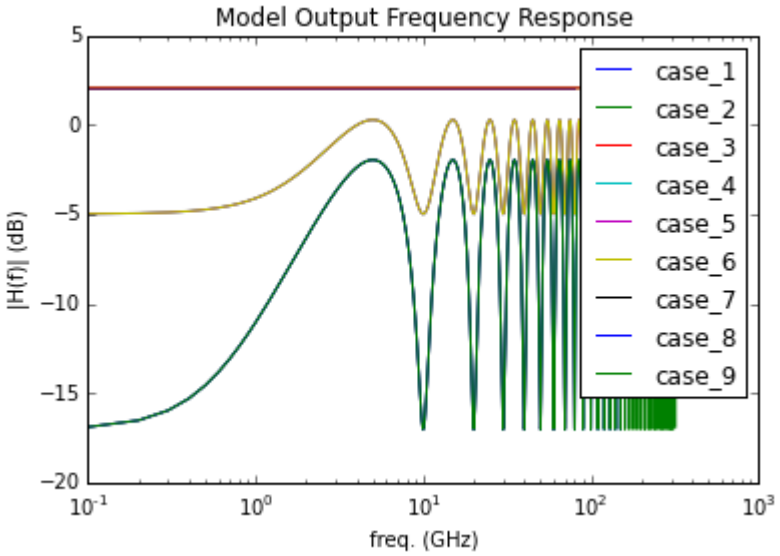
- Visit the project's wiki page: https://github.com/capn-freako/ibisami/wiki
- Click on the *Developer Help* link.
- REQUEST: Please, fork your own copy of the project, on GitHub, rather than cloning mine to your working machine. Thanks!

Sanity checking results

- Tx

Case #	Post-tap 1	Samps./bit
1	0	16
2	0	32
3	0	64
4	5	16
5	5	32
6	5	64
7	10	16
8	10	32
9	10	64

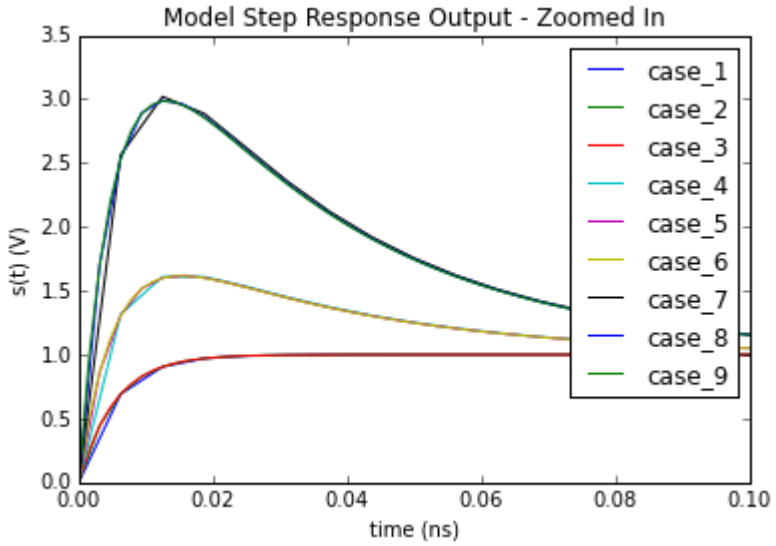


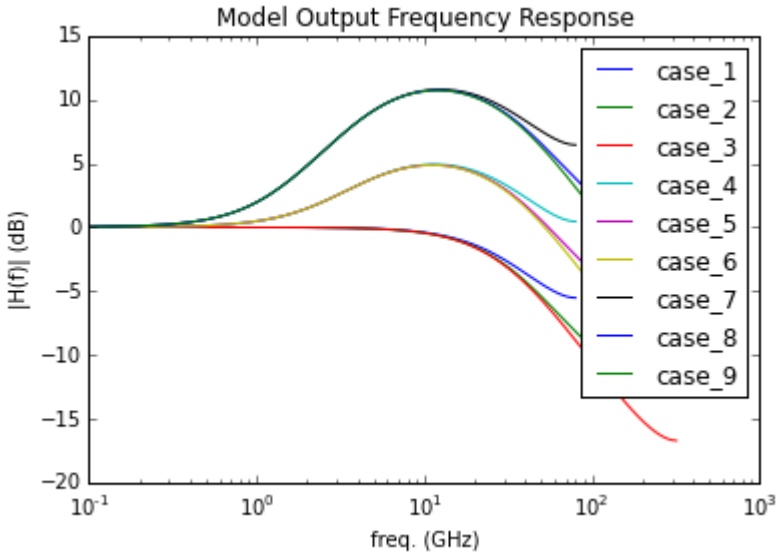


Sanity checking results (cont'd.)

- Rx - CTLE

Case #	CTLE Mag. (dB)	Samps./bit
1	0	16
2	0	32
3	0	64
4	6	16
5	6	32
6	6	64
7	12	16
8	12	32
9	12	64





Sanity checking results (cont'd.)

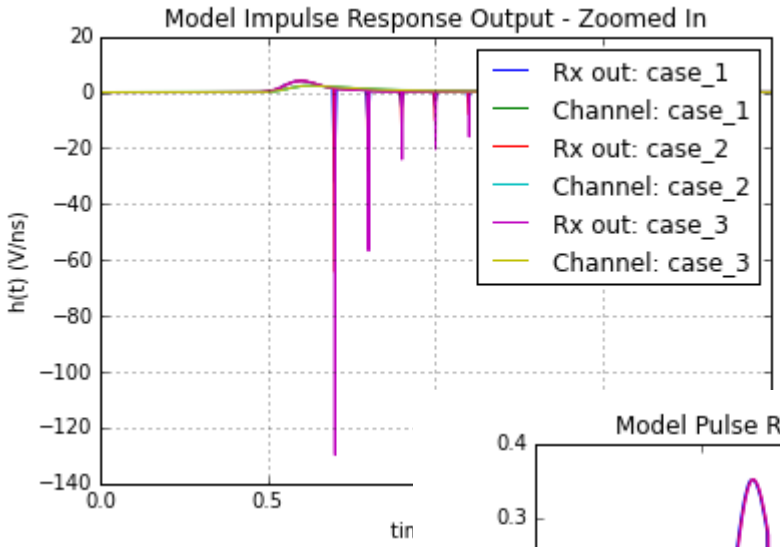
- Rx – DFE "pseudo-adaptation"

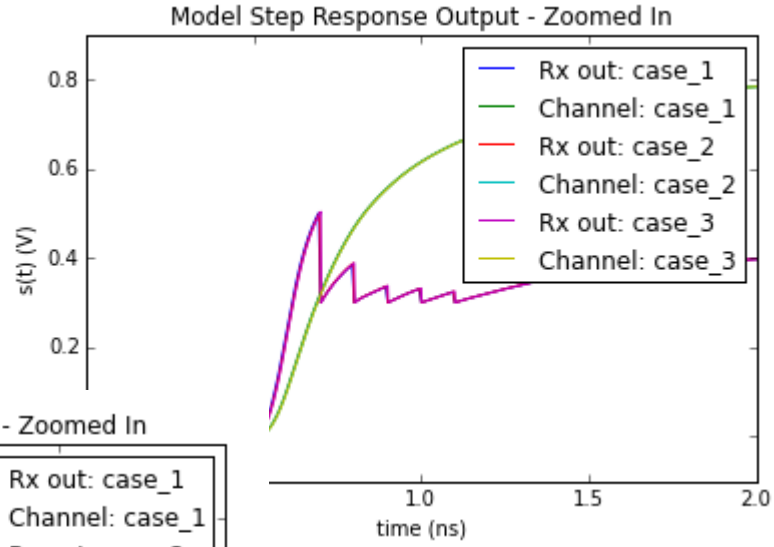
```
ibisami example Rx model was configured successfully, as follows:
    CTLE: 12 dB boost at 5 GHz
    DFE: mode: 2 vout: 0.3 gain: 0.02
        tap1: 0
        tap2: 0
        tap3: 0
        tap4: 0
        tap5: 0
Parameter string from model:
(example_rx (dfe_tap1 0.339981) (dfe_tap2 0.114927) (dfe_tap3 0.0422948)
(dfe_tap4 0.0353201) (dfe_tap5 0.0270327))
```

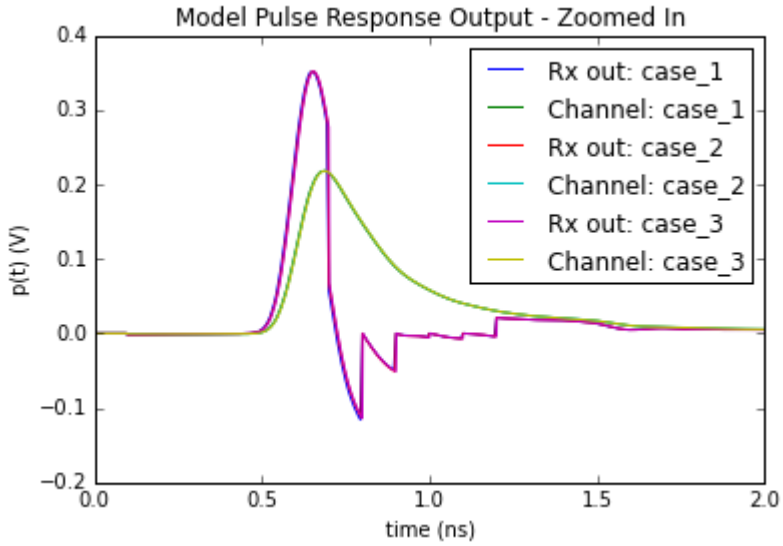
- Note: The "adaptation" was NOT the result of successive *GetWave*() calls. (There is no *GetWave*() in this model.) (See [1].)

Sanity checking results (cont'd.)

- Rx – DFE "pseudo-adaptation" (cont'd.)







Acknowledgements

- **Michael Steinberger, Todd Westerhoff, and Christopher White**, for [1], from which I took the idea of including an approximation of the DFE behavior in the impulse response returned by *AMI_Init*().

[1] Michael Steinberger, Todd Westerhoff, and Christopher White, *Demonstration of SerDes Modeling using the Algorithmic Model Interface (AMI) Standard*, DesignCon 2008.

Thank you! Questions?