

HICUM - Productization and Support Update

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HICUM/L2 Version 2.23 update

Code related minor changes only

- Lateral NQS effect in small-signal model formulation

HICUM/L2v2.22: (Last two derivatives signify Cdei+Ccdei and CdcI+Cbdci)

$$C_{rBi} = f_{crBi} (ddx(Q_{jEi} V(bi)) + ddx(Q_{jCi} V(bi)) + ddx(Q_{dEi} V(bi)) + ddx(Q_{dCi} V(bi)))$$

$$Q_{rBi} = C_{rBi} V(bp, bi)$$

HICUM/L2v2.23: (Cdei and CdcI are included only)



$$C_{rBi} = f_{crBi} (ddx(Q_{jEi} V(bi)) + ddx(Q_{jCi} V(bi)) + (-1)ddx(Q_{dEi} V(ei)) + (-1)ddx(Q_{dCi} V(ci)))$$

$$Q_{rBi} = C_{rBi} V(bp, bi)$$

Note: theory for Crbi is valid only for small-signal case!

=> recommended to be used only for small-signal operation

- Parameters ranges

- FGEO : v2.22 from [0,1]  v2.23 from [0,inf] also in HICUM/L0
- FDQR0 : v2.22 from [0,1]  v2.23 from [0,inf]

HICUM/L2 Version 2.23 update (contd.)

Code related minor changes only

- Collector current spreading

HICUM/L2v2.22:

$$\left. \begin{array}{l} \text{For } LATB > 0.01 \quad FClnl = \ln(1 + latl \times FCw) \\ \text{For } LATB \leq 0.01 \quad FClnl = latl \times FCw \end{array} \right\}$$

FClnl is passed to HICFCI and HICFCT routines that produce inconsistency

similar case for $FClnb = \ln(1 + latb \cdot FCw)$

HICUM/L2v2.23:

Correct expression $FClnx = \ln(1 + latx \cdot FCw)$
coded ONLY inside HICFCI and HICFCT

No conditional change,
hence no inconsistency

- In `@(initial_model)`, external if-block for `HICTUN_T` removed since it tried to access voltage `V(bp,ei)` and `V(bi,ei)`
- HICUM/L2 v2.23 and HICUM/L0 v1.12 to be released yet
- HICUM/L0 requests re. parameters, testing, application (e.g. III-V HBTs)