Contribution ID: **503** Type: **Oral Presentation**

Extracting device parameters of pn-junction diodes using sigmoidal properties of resistance – voltage curves: theory, simulation and application

Thursday, 12 July 2012 08:20 (20 minutes)

Abstract content
   (Max 300 words)

Current-voltage (I-V) curves of pn-junction diodes obtained at a known temperature T are often characterised using the non-ideal diode model of diodes having an ideality factor k, reverse saturation current Io, series resistance Rs and shunt resistance Rsh. The graph of diode resistance R against bias potential V is sigmoidal with a singularity at V=0 so that diode resistance at V=0 is obtained only as a limit for V approaching 0. The Lambert W function is used to obtained analytic expressions forI, V and R. An injective logarithmic mapping function is then used to transform the analytic expression for R to avoid the singularity at V=0. The resulting injective multidimensional expression for R is finally optimised to fit experimentally determined resistance values for germanium curves, using the Levenberg-Marquardt method.

Apply to be
 consider for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD)?

Hons

Main supervisor (name and email)
and his / her institution

Mr. Nchimunya Mwiinga

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

No

Primary author: Ms HANGOMA, Pesi (Univeristy of Zambia)

Co-authors: Mr MWIINGA, Nchimunya (University of Zambia); Dr SIBANDA, Patrick (University of Zambia)

Presenter: Ms HANGOMA, Pesi (Univeristy of Zambia)

Session Classification: DCMPM1

Track Classification: Track A - Division for Condensed Matter Physics and Materials