Report 07

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1 Circuit

1.1 Nodes and components

The circuit is implemented as a module with three components and three nodes:

- The alternating **current generator** is between nodes `n` and `p`;
- The **junction diode** is between nodes `p` and `res`;
- The **resistor** is between nodes `res` and `n`.

The node `n` is also defined as the **ground node**.

1.2 Behaviour

The generator's potential is defined in the *vsrc.vams* file as a `sin` wave with an amplitude of $3V$.

The current in the diode is modeled by the following expression:

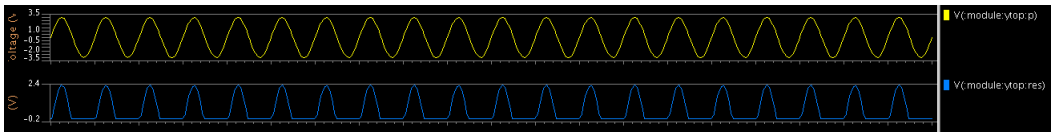
$$I(p, res) = I_s \cdot e^{\frac{V(p,res)}{V_t}}$$

, where $I_s = 10^{-15}A$ is the **saturation current** and V_t is an environment parameter function, representing the **thermal voltage**.

The electrical resistance value of the resistor is 100Ω, and the current between its nodes is defined using the classical *Ohm's law*: $I(res, n) = \frac{V(res,n)}{100\Omega}$.

2 Waveforms

The circuit has been simulated for 10 seconds, and it produced the following waveforms:



The top wave represents the generator, while the second one is the voltage between the diode nodes.

When the input voltage reaches the **threshold voltage** value (which is approximately $0.7V$), the tension between the nodes of the diode will be positive. Instead, when the input voltage is below zero, the tension in the diode will be zero as well.