Precisions et methodes for exercises on diodes

1. Show that a diode is operating in direct ou reverse mode: Reasoning by the absurd

To show, by reasoning with the absurd, that a diode operates in direct or reverse mode, we assume the opposite and we show that this is not possible by finding an absurdity either on the current I_{AK}, or on the voltage V_{AK}.

Thus, to show that a diode operates in:

- ✓ Direct mode, we suppose it operates in reverse mode, and we replace it with an open switch. We measure the voltage V_{AK} between its terminals and we show it's greater than 0 (ideal model) or than V_0 (threshold model)
- ✓ Reverse mode, we suppose it operates in direct mode, and it is replaced, according to the models, by a wire (ideal model), an ideal voltage generator V_0 (Threshold model) or a real voltage generator $V_0 + r_D$ (real model). We calculate the current I_{AK} crossing the diode and we show it is neagative.

2. Justifier which diodes operate in direct mode and which diodes operate in reverse mode in rectifier schemes

In rectifier schemes, in order to find which diodes operate in direct mode, we should use the following properties:

- ✓ In a diode, the current is flowing from the anode to the cathode.
- ✓ The anode potential is greater the cathode potential.

3. Drawing curves

If you need to draw a curve, you will have to express the output voltage in all possible states of the diode or diodes. It is therefore necessary to consider all possible cases, express this output voltage in each case, and determine which input voltage values correspond to each state. It is always easier to determine the condition on the input voltage when the diode or diodes are blocked and then deduce the intervals of the input voltage corresponding to each case.

If you are asked to plot a transfer characteristic, you must plot the output voltage of the fixture according to the input voltage.

If you are asked to trace the evolution of the output voltage as a function of time, it is always easier to trace the input voltage first.

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