BJT-Biasing [DC]

This program is calculating 7 BJT Biasing.

- Code Toturial
- Circuits

Code Toturial

Class **DC_Bio** is the main class that calculation is done there.

Class Properties

- `Beta` : The**β** of the Transistor.
- `Circuit_Number` : The number of cirtuit that has been selected.(distinguish by Fig. number.)
- `Je` : The**Emitter Junction** for the Transistor.
- `Ie` : The current of the Emitter.
- `Ib` : The current of the Base.
- `Ic` : The current of the Collector.
- `R_E` : The Resistor of the Emitter.
- `R_B` : The Resistor of the Base.
- `R_C` : The Resistor of the Collector.
- `V_EE` : Voltage generator of the Emitter.
- `V_BB` : Voltage generator of the Base.
- `V_CC` : Voltage generator of the Collector.
- `V_CE` : The**Collector-Emitter Voltage**.
- `V_BE` : The Base-Emitter Voltage that it's default value is`0.7`. > If pass the `0` value to this property it set the default value.[It must be send at least one value to it.]
- `V_Sat` : The Collector-Emitter Saturation Voltage that it's default value is`0.2`. > If pass the `0` value to this property it set the default value.[It must be send at least one value to it.]

Class Methods

- **Cunstructor**
    - **Arguments** :
        - bool jE,
        - int circuit_number,
        - decimal beta,
        - decimal vsat = 0 // default value is 0
    - **Description** :
        - It is initial the value of `Je` , `Circuit_Number` , `Beta` , `V_Sat`.

    - **Return Type** : `none`

- **DC_Initial**
    - **Arguments** :
        - decimal rc = 0,
        - decimal rb = 0,
        - decimal vbb = 0,
        - decimal vcc = 0,
        - decimal re = 0,
        - decimal rb1 = 0,
        - decimal rb2 = 0,
        - decimal vee = 0 > All arguments have default value 0.
    - **Description** :
        - It is initial the value of all it's equal props.
    - **Return Type** : `void`
- **CalCulate_VCE**
    - **Arguments** : `none`
    - **Description** :
        - It is calculate the amount of the `V_CE` .
    - **Return Type** : `decimal` the result of `V_CE` value.
- **Cal_Ic**
    - **Arguments** : `none`
    - **Description** :
        - It is calculate the amount of the `Ic` by `Ib` .
    - **Return Type** : `decimal` the result of `Ic` value.
- **Cal_Ie**
    - **Arguments** : `none`
    - **Description** :
        - It is calculate the amount of the `Ie` .
    - **Return Type** : `decimal` the result of `Ie` value.
- **Cal_Ib**

- **Arguments** : `none`
- **Description** :
  - It is calculate the amount of the `Ib` that distinguished by `Circuit_Number` .
- **Return Type** : `decimal` the result of `Ib` value.

- **Cal_Vce**
  - **Arguments** : `none`
  - **Description** :
    - After calculating `Ic` and `Ib` that has been called in `CalCulate_VCE` method , the `CalCulate_VCE` method call the `Cal_Vce` to calculate the `V_CE` .
  - **Return Type** : `decimal` the result of `V_CE` value.
- **IsActive**
  - **Arguments** :
    - decimal Vce
  - **Description** :
    - It is find the stated of the Transistor.
  - **Return Type** : `int` , it is return `2` if transistor is `Active` , return `1` if transistor is `Saturated` , return `0` if transistor is `disable` .
- **IsActive_Message**
  - **Arguments** :
    - decimal Vce
  - **Description** :
    - It is find the stated of the Transistor by calling `IsActive` method.
  - **Return Type** : `string` , it is return the message to show the state of the transistor.

Circuits

For all the circuits we must get `β` , `V_BE` , `V_Sat` .

By default they are assign such this value:

`V_Sat = 0.2` (`V_Sat` is `V_CE` in the **Saturation** mode)

`V_BE = 0.7`

Circuit 1

Figure1.1.png

Fig. 1.1

For this circuit we should get `R_B` , `R_C` , `V_CC` , `V_BB` form the user.

Circuit 2

Figure1.2.png

Fig. 1.2

For this circuit we should get `R_B` , `R_C` , `R_E` , `V_CC` , `V_BB` form the user.

Circuit 3

Figure1.3.png

Fig. 1.3

For this circuit we should get `R_B` , `R_C` , `V_CC` form the user.

Circuit 4

Figure1.4.png

Fig. 1.4

For this circuit we should get `R_B` , `R_C` , `R_E` , `V_CC` form the user.

Circuit 5

Figure1.5.png

Fig. 1.5

For this circuit we should get `R_B1` , `R_B2` , `R_C` , `R_E` , `V_CC` form the user.

Circuit 6

Figure1.6.png

Fig. 1.6

For this circuit we should get `R_B` , `R_C` , `R_E` , `V_CC` form the user.

Circuit 7

Figure1.7.png

Fig. 1.7

For this circuit we should get `R_B` , `R_C` , `R_E` , `V_CC` form the user.
