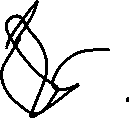
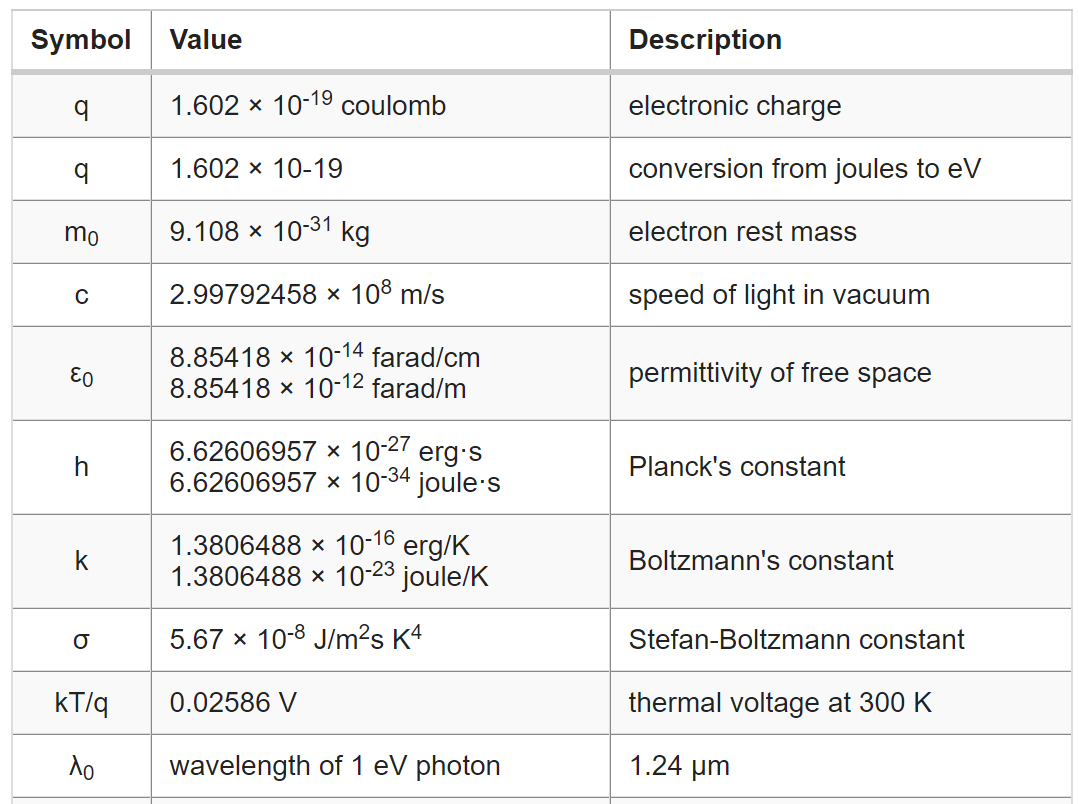
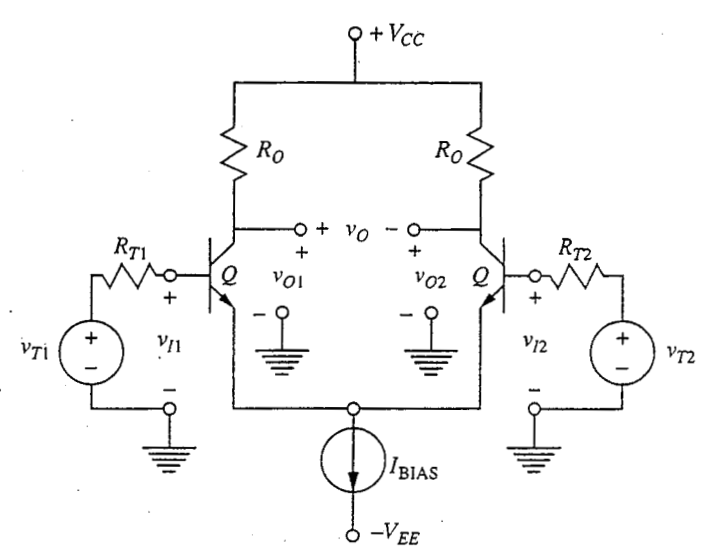
We want to set , such that the green times the red is equal to 1.

We want to set the term outside tanh to 1:





So far things seem to be not so complicated. A bit more effort will be needed with the tanh activation. Luckily, the differential amplifier stage {fig} follows the tanh characteristic. I will provide the required equations to design an analogue tanh activation here, but if you are interested in the analysis of the circuit {ref} has an excellent explanation.



The inputs to output relationship of the circuit above is:

Where is the electronic charge, is Boltzmann's constant and is the temperature of the device. The expression is known at the thermal voltage and its value at (approx. room temperature) is . This value will be used below for simplicity.

The first step of converting the circuit above into a tanh activation is to connect to ground (make it ). The differential output voltage then becomes (also including the value of ):

One of the problems with the expression above is that is scaled by .

