For the variable in the interface ：



This should be comes from the Poisson equation, so I think the  can be wrote as the form of the electric displacement vector of the interface:



Here, the subscript “interface,i” represents the interface variable determined by node “i”, which is in the side “1” of the interface. This is actually the needed term in the interface equation. Similarly, for the node “j” in the side “2”:



If we reference the direction in the picture of (Simlinger et al), the direction of  is opposite to . Considering the “continuous” interface condition in DEVSIM:



Using the form of electric displacement vector of the interface:



This is suitable for the condition whose interface doesn’t exist sheet charge.

Now we consider the interface condition with sheet charge. The aimed equations are:



To achieve this interface condition, we can consider these equations:



In this condition, if we still consider the “continuous” interface condition:



So in short, just need create the node model called “surface\_charge” equal to  in both side, and make sure:



Then the sheet charge can be included in the Poisson equation.

For the thermionic emission, it is easier to set the interface condition, because the net current density is given by:



Using the form of “fluxterm” in DEVSIM:

