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| REPORT |
| 2nd Homework |

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| Subject | Computational Microelectronics |
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| Due Date | 2018/09/17 - 8AM |



<Selection of the model>

I choose the distance of material that these are set to be 100nm with half silicon layer and half SiO2 layer. Through calculating of the general Poisson equation, the analytic solution per area is below

* = 8.85 \* 10-12  
   = 3.9 \* 8.85 \* 10-12  
   = 11.68 \* 8.85 \* 10-12  
   = 50 \* 10-9 m  
   = 50 \* 10-9 m

<MATLAB Simulation>

The discrete number is 1001-point and the electrostatic potential boundaries of and are selected by 1 and 0 respectively. The first layer is SiO2. Through the derived discretization equation from the general Poisson equation, I can figure out the total charge per area by the law of coulomb.

The capacitance per area is solution of the above equation. Since the boundary condition voltage is set by 1. Both the analytic solution and MATLAB simulation are almost same results that the capacitance is ‘5.1776 x 10-4 F/m2 (=517.50 μF/m2)’.

So I confirm that the analytic and the general Poisson equation are almost same and valid for calculating the unit area capacitance.

\*\* The MATLAB code is shown in the next page.

