HW 15.

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$$\begin{array}{c|c}
N^{+}=N_{1} & N^{+}=N_{2} & N^{+}=N_{1} \\
E & E & E
\end{array}$$

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\end{array}$$

$$\begin{array}{c|c}
N^{+}=N_{1} & N^{+}=N_{2} & N^{+}=N_{1} \\
N(0) & N(L) & N_{1} \\
V_{T} & = \frac{k_{B}T}{E}, N_{1} & = 1.075 \times 10^{16} \text{ M}^{-3}, T & = 300 \text{ K}
\end{array}$$

Residues 
$$\left\{ \begin{bmatrix} R_{\beta} \end{bmatrix}_{i} = \frac{\varepsilon}{\varepsilon_{0}} \left( \beta_{i-1} - 2\beta_{i} + \beta_{i+1} \right) + \frac{(\Delta R)^{2}}{\varepsilon_{0}} \mathcal{G} \left( N^{+} - N_{i} \right) \right\}$$
 $\left[ R_{n} \right]_{i} = \frac{N_{2H} + N_{i}}{2} \cdot \frac{\beta_{2H} - \beta_{2}}{\Delta x} - V_{1} \frac{N_{2H} - N_{i}}{\Delta x} - \frac{N_{2} + N_{2H}}{2} \cdot \frac{\beta_{2}^{2} - \beta_{2H}}{\Delta x} + V_{1} \frac{N_{1} - N_{2H}}{\Delta x} \right]$ 

 $J_{acobians} \left\{ \begin{array}{l} \partial_{g_{i}} [R_{g}]_{\lambda} = -2 \frac{\mathcal{E}}{\mathcal{E}_{o}} , \partial_{g_{i+1}} [R_{g}]_{\lambda} = \frac{\mathcal{E}}{\mathcal{E}_{o}} , \partial_{g_{i+1}} [R_{g}]_{\lambda} = \frac{\mathcal{E}}{\mathcal{E}_{o}} \\ \partial_{n_{\lambda}} [R_{g}]_{\lambda} = -\frac{(\Delta \eta)^{2}}{\mathcal{E}_{o}} \mathcal{E} \\ \partial_{g_{i}} [R_{n}]_{\lambda} = -\frac{n_{\lambda 1} + n_{\lambda}}{2\Delta \chi} - \frac{n_{\lambda} + n_{\lambda 1}}{2\Delta \chi} , \partial_{g_{i+1}} [R_{n}]_{\lambda} = \frac{n_{\lambda 1} + n_{\lambda}}{2\Delta \chi} , \partial_{g_{i+1}} [R_{n}]_{\lambda} = \frac{n_{\lambda} + n_{\lambda 1}}{2\Delta \chi} \\ \partial_{n_{\lambda}} [R_{n}]_{\lambda} = \frac{n_{\lambda 1} + n_{\lambda}}{2\Delta \chi} - \frac{n_{\lambda} + n_{\lambda 1}}{2\Delta \chi} + \frac{2V_{T}}{2\chi} , \partial_{n_{\lambda 1}} [R_{n}]_{\lambda} = \frac{n_{\lambda} + n_{\lambda 1}}{2\Delta \chi} - \frac{V_{T}}{2\lambda \chi} , \partial_{n_{\lambda 1}} [R_{n}]_{\lambda} = -\frac{n_{\lambda} + n_{\lambda 1}}{2\Delta \chi} - \frac{V_{T}}{2\Delta \chi} \\ \partial_{n_{\lambda}} [R_{n}]_{\lambda} = \frac{n_{\lambda} + n_{\lambda}}{2\Delta \chi} - \frac{N_{\lambda} +$ 

Poisson + Continuity eq.

Residue vector  $R = (R_{\beta 1}, R_{n_1}, R_{\beta 2}, R_{n_2}, \cdots, R_{\beta n}, R_{n_n})^T$ Jacobian matrix  $J = \begin{pmatrix} \frac{\partial R_{\beta 1}}{\partial \beta_1} & \frac{\partial R_{\beta 2}}{\partial \beta_1} & \cdots & \frac{\partial R_{\beta n}}{\partial \beta_n} & \frac{\partial R_{\beta n}}{\partial \beta_n} & \cdots & \frac{\partial R_{\beta n}}{\partial \beta_n} & \frac{\partial R_{\beta n}}{\partial$ 

Solution Vector  $\Phi = (\beta_1, N_1, \cdots, \beta_N, N_N)^T$ 

\*Algorithm: Rit Ji Newton method obstall == 70221.

Solve 
$$JSP = -R$$
  $\longrightarrow \Phi + SP \rightarrow \Phi$ 

No  $\max(\frac{63}{2}) < \eta_2 > 0$ 

End

Results \( \xi = 11.77 \) \( \xi \) \( \lambda \) \( \la

## i) Long Structure: L=600 nm Poisson+Continuity Non-linear Poisson Poisson+Continuity Non-linear Poisson specing = 1 nm Spacing = 10 mm 0.42 0.40 0.40 0.40 (γ) (x) φ ر**اه ک** (x)u (\*) (X)) 0.34 x (m) Poisson+Continuity spacing = 0.5 mm ) 0.40 (< M > (x)u 0.34 x (m) ii) Short structure: L= 60 nm Spacing=1 nm spacing=5nm Poisson+Continuity Non-linear Poisson Poisson+Continuity Non-linear Poisson C**3/C)** (x)\$\phi\$ Q/C) (x) \$\phi\$ 0.43 x (m) <sup>3</sup> (m) <sup>з</sup> (m) x (m) Poisson+Continuity Non-linear Poisson spacing=0.2 nm (2/c) (x)¢ 0.42 0.41 x (m)

Non-linear Poisson とうき うな N(x) サダスカラ Poisson + Continuity eg. 으로 うちと N(x), ダスカチ イン( オロオ ひんた