

Students Name: _____

Students ID: _____

Students Signature: _____

ECE 6397, Spring 2007
Electrochemical Nanofabrication Technology

Project # 4

Due Date: Thursday April 26th 2007

Date: Tuesday April 17th 2007, 1:15 PM.

Score: _____

Problem Description:

Consider (read and try to understand) the paper describing the electropolishing theory by C. Wagner, J. Electrochem. Soc., 101, 225 (1954). If you can not find the paper in the library, Shyamala has it, and ask her for copy. After you digested the main result of the paper, please proceed with reading your project problem:

In the figure below (Figure 1.) the portion of the Cu surface profile is given resembling the periodic square wave. After 30 sec of polishing find the displacement of the surface average plain u , and calculate what it should be the profile of the resulting surface morphology? Show result only for one period length.

Hints:

1. Use polishing current of 50 mAcm^{-2} for your calculations. Assume that $\text{Cu} \rightarrow \text{Cu}^{2+} + 2e^-$ is the only Cu dissolution reaction during electropolishing. Take the Cu molar density ρ to be 0.15 molcm^{-3} .
2. Use the mat lab as a convenient tool to work this problem. Think about what would be the suitable series expansion of the square wave function that you can use to solve this problem.

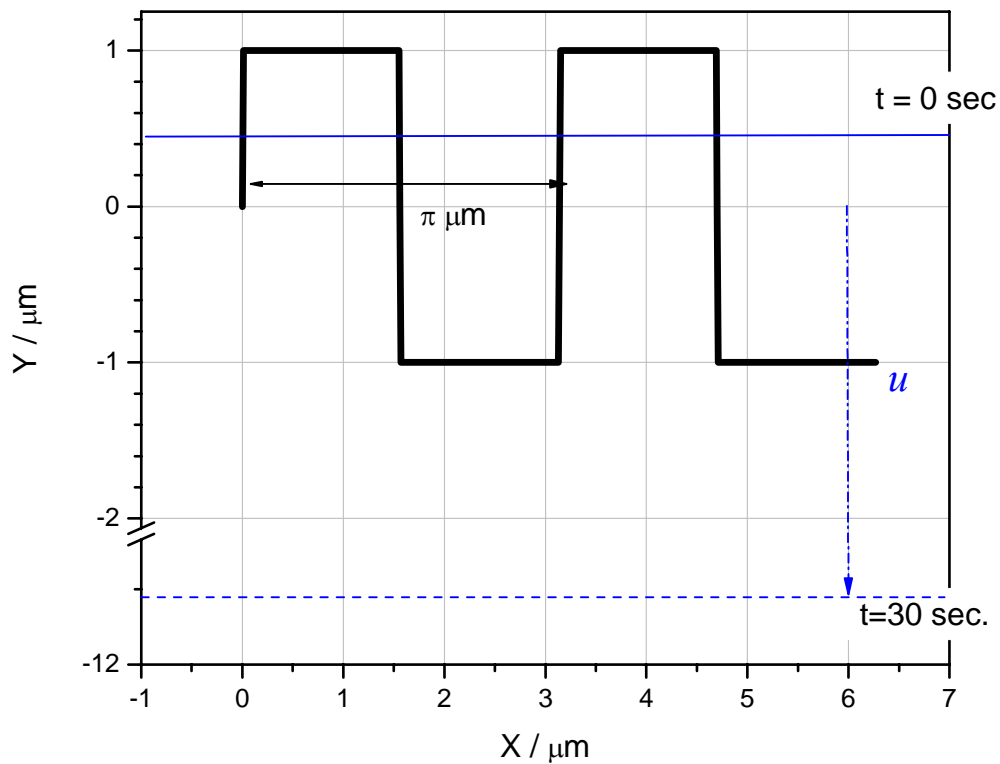


Figure 1.