

Problem 7 (due Monday, December 1 )

Consider an  $m \times n$  rectangle divided into  $mn$  unit squares. Let  $T$  be the set of all vertices of the unit squares. At each point of  $T$  we draw a short arrow (say of length  $1/2$ ) pointing up, down, left, or right with the condition that no arrow sticks outside the rectangle. Prove that regardless of how the arrows are chosen, there always must exist two vertices of the same unit square at which the arrows point in opposite directions.

The problem was solved by Levi Axelrod and Matt Wolak. For detailed solutions and connections to some results in topology see the following link [Solution](#).

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