

# MSc thesis defense presentation

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## defends his MSc thesis

<b>Date:</b>	Τρ <span>η</span> , 04 Οκτ 2016
<b>Ώρα:</b>	11:00
<b>Location:</b>	<a href="#">Εθνικ<span>η</span> και Καποδιστριακ<span>η</span> Πανεπιστ<span>η</span>μιο Αθην<span>η</span>ν, Τμ<span>η</span>μα Μαθηματικ<span>η</span>ν, room A11</a>
<b>Thesis title:</b>	<a href="#">An Alternative Proof for the NP-completeness of the Grid Subgraph Problem</a>
<b>Committee:</b>	<ul style="list-style-type: none"><li>• <a href="#">Δημ<span>η</span>τρης Φωτ<span>η</span>κης</a></li><li>• <a href="#">Στα<span>ν</span>ος Κολλι<span>π</span>ουλος</a></li><li>• <a href="#">Δημ<span>η</span>τριος Μ. Θηλυκ<span>η</span>ς</a></li></ul>

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## Thesis abstract

In the field of Graph Drawing, there is great interest for results regarding the embedding of a given graph on a grid, mainly due to the applications on the VLSI circuit design. Moreover, determining whether a graph accepts a unit-length embedding, i.e., a matching of its vertices and edges to vertices and edges of a large enough grid, is the same as asking whether the graph is a subgraph of that grid.

We consider the Grid Subgraph problem, in which given a planar (not necessarily connected) graph  $G$ , we need to determine if  $G$  is isomorphic to a subgraph of a large enough grid. We prove that this problem is NP-complete by employing simple and intuitive gadgets to perform a reduction from a SAT-variant. In addition we prove that a special case of that problem, the  $(k \times k)$ -Grid Subgraph problem, in which the size of the grid is given in the input, is also NP-complete.