

Comprehension questions

PROBLEM 10.1. *By comparing it with rectangles, give lower and upper bounds for the principal frequency of a regular hexagon. (There is no known elementary formula for this frequency.)*

PROBLEM 10.2. *What bound for the principal frequency of a $(5/3) \times (5/4)$ square does one get from the test function $f(x, y) = xy(5/3 - x)(5/4 - y)$? Compare the bound and the actual value (It's ok, and indeed highly recommended, to use computer assistance in the computation.)*

PROBLEM 10.3. *Let U be the triangle with vertices at $(-1, 0)$, $(1, 0)$ and $(0, 2)$. Find upper and lower bound for the principal frequency (as good as you can manage them to be), by comparing it with equilateral triangles.*

PROBLEM 10.4. *Take the same triangle as in the previous problem. What bound for the principal frequency do you get from the test function $f(x, y) = y(2x + y - 2)(-2x + y - 2)$? (It's ok, and indeed highly recommended, to use computer assistance.)*

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