Fourier family match on an elastic rectangle under its own weight

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A b s t r a c t : Surfaces of many structures in the scope of earth sciences contain sharp edges and corners where mechanical stress concentrates, and where not only the real material but also the mathematical methods of displacement or stress field investigation are most likely to fail, or, as for the latter, to have at least some difficulties. How do the methods of the Fourier family perform in such situations? We gathered some of them for a friendly match in solving the 2D biharmonic problem in a linearly elastic rectangle under its own weight. The prize is quite strange – the winner shall become a referee for future (mis)matches with other methods like finite element method.

Key words: plane strain, biharmonic equation, method of homogeneous solutions, method of superposition

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