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Implementation of the analytical solutions in the finite element method

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SUMMARY

This paper presents an application of well known analytical solutions for removing certain restrictions referred to the local effect simulation in the finite element method. The procedure is illustrated by the problem of plate bending which are subjected to concentrated load. The analytical solution is applied in the immediate neighbourhood of the concentrated load as a "particular" part of the total solution, while the "homogenous" part of the solution is obtained on the whole region by means of finite element technique.

The given examples present high accuracy of the considered approach achieved by coarse finite element meshes.

This technique can be also applied to problems of another type, using St. Venant's principle of the equivalent applied forces outside of the loaded region.