

## عنوان مقاله:

Static analysis of porous functionally graded beams resting on elastic foundation using differential quadrature method

## محل انتشار:

دومین کنفرانس بین المللی مهندسی مکانیک و هوافضا (سال: 1396)

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## خلاصه مقاله:

Static analysis of simply supported functionally graded (FG) beams resting on two-parameter elastic foundation is studied based on the third-order shear deformation beam theory formulation. The material properties vary continuously through the thickness direction according to a power-law distribution in terms of the volume fraction of the material constituents. Due to the possibility of the existence of imperfection inside functionally graded materials during the fabrication process, it is necessary to consider static analysis of beams having porosities in this investigation. Based on the distribution of porosities within the FG beam cross section, two different models are used to describe and approximate the material properties of FG beams with porosity phases. In order to discretize the governing equations, the differential quadrature method (DQM) in conjunction with the Hamilton's principle is used. The convergence of the method is demonstrated, and in order to validate the results, comparisons are made with the solutions for the isotropic and FG beams. By examining the results of the FG beam for various geometrical and material parameters with the inclusion of the supporting elastic foundation, the influence of these parameters, and in particular those due to functionally graded material parameters, on the normal and shear stresses distribution through the thickness direction of FG beam are studied. Also the effects of these parameters on the lateral and axial displacements are demonstrated.

## کلمات کلیدی:

,Static analysis, Functionally graded beam, Porosity, DQM, Elastic foundation, Third-order beam theory

## لینک ثابت مقاله در پایگاه سیویلیکا:

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