Calculation of crustal deformations by a fault movement with the multipurpose FEM solver

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We developed a new numerical method to analyze fault problems which is readily practicable by multipurpose FEM solvers. The analysis for time independent elastic problems is divided into two steps. First we choose displacements on the two faces of the fault so that their difference be the slip of the fault, and then solve a problem with the chosen displacement on the fault as a boundary condition. In the second step analysis, we impose the nodal force obtained through the first step and a constraint that the pairs of node on the two faces of the fault are fixed. The difference of the results in the two steps gives a solution for the specified relative slip on the fault. Comparison of the numerical result with the analytical solutions is satisfactory.