

The FORTRAN 90 code **BEMplast** has been developed to solve the numerical examples presented in [1]. It is a general-purpose boundary element software, permitting the analysis of two-dimensional, incompressible linear elastic or elastic-plastic (linear strain hardening) J2-flow theory solids (as described in [1]).

As particular cases of the formulations given in [2] and [3], the purely elastic solutions that can be obtained with **BEMplast** are linear elastic, isotropic and incompressible.

The following two executables are given:

- **BEMplast_Noiteration**, in which the forward-Euler integration scheme proposed in Sect. 4.2.1 of [1] has been implemented;
- **BEMplast_iteration**, in which the iterative procedure described in Sect. 4.2.2 of [1] has been implemented.

To run one of the two above executables, an input file is needed, which must be supplied just after the start of the program (note that the input file should be located in the same directory containing the program executable). As an example, we provide the two input files:

node_NoRoller_elastic
and
node25_8_NoRoller

both corresponding to the solution of the problem presented in Sect. 5.2. case A (foundation on a vertical cut in [1]), see Fig. 1. The former of the above files produces a purely elastic solution (so that subdomains are not defined in it and the statement *plastic is not present), whereas the latter is the file used to produce the solution plotted as Fig. 13 in [1], so that 25 subdomains with 8 elements each are defined.

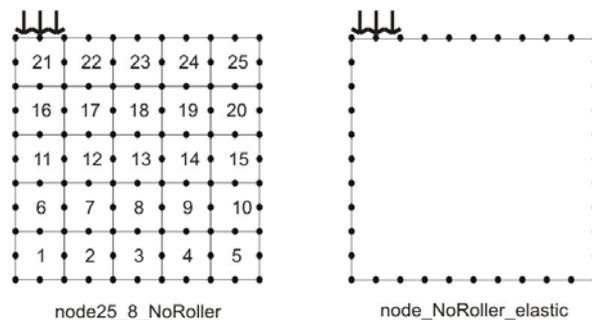


Figure1. Discretization employed in the two input files. (a) discretization for the elastic-plastic solution (b) discretization for the elastic solution

A directory named **Result**, should also be created within the directory where the executable is located. All the output files will be saved in that folder.

The output files (located in the directory Result) are:

- 1) **geom.txt** file, where the data regarding the initial geometry of the problem are reported;
- 2) **spost.txt** file, where the results are reported in terms of boundary displacement, tractions and internal fields.

We provide two commented examples of the above files for information, namely

geom25_8_NoRoller.txt

spost25_8_NoRoller.txt

REFERENCES

- [1] Bertoldi K., Brun M. and Bigoni D., A new boundary technique for elasto-plastic solids". *International Journal for Numerical Methods in Engineering*, 2005, in press.
- [2] Bigoni, D. and Capuani, D. Green's function for incremental nonlinear elasticity: shear band and boundary integral formulation. *Journal of the Mechanics and Physics of Solids*, 2002, **50**, 471-500.
- [3] Brun, M. Capuani, D. and Bigoni, D., A boundary element technique for incremental, nonlinear elasticity. Part. I and II. *Computer Methods in Applied Mechanics and Engineering*, **192** (22-24), 2461-2499.