Faculty of Maritime Engineering and Marine Sciences

Finite Elements

Assignment N°3b– FEM beam analysis in the plane Nov. 08th, 2021

Teamwork (3 students per group, at least one must be of different sex if possible and one must be from outside Guayaquil). Each group will select a leader, who is responsible to chair meetings, organize the tasks, load the final report in the AulaVirtual platform, and, report the contribution from each member).

1.- Implement the finite element method to analyze structures composed by beams in the plane. For that, first prepare a flow chart and then proceed with the programming. Data and results must be read and print in text files opened from the program.

You have to use Python programming language and in the code include: names of team members, date, name of course, description of the algorithm, list of input/data and output/results variables, and, references. Also you have to include comments in the source code to identify different steps in the process. To check the program, you must run a problem available in the literature.

2.- Use your computer program to analyze one of the plane frames of the steel ship structure assigned to your group, similar to the one shown in the picture. The sectional inertia has to be calculated with the spacing between frames and the plate thickness. To simplify calculations, you may consider only one side of the structures, and joints at this plane are clamped. As we assumed in Ship's Structure class, point at the connection between side and deck may considered as simply supported.

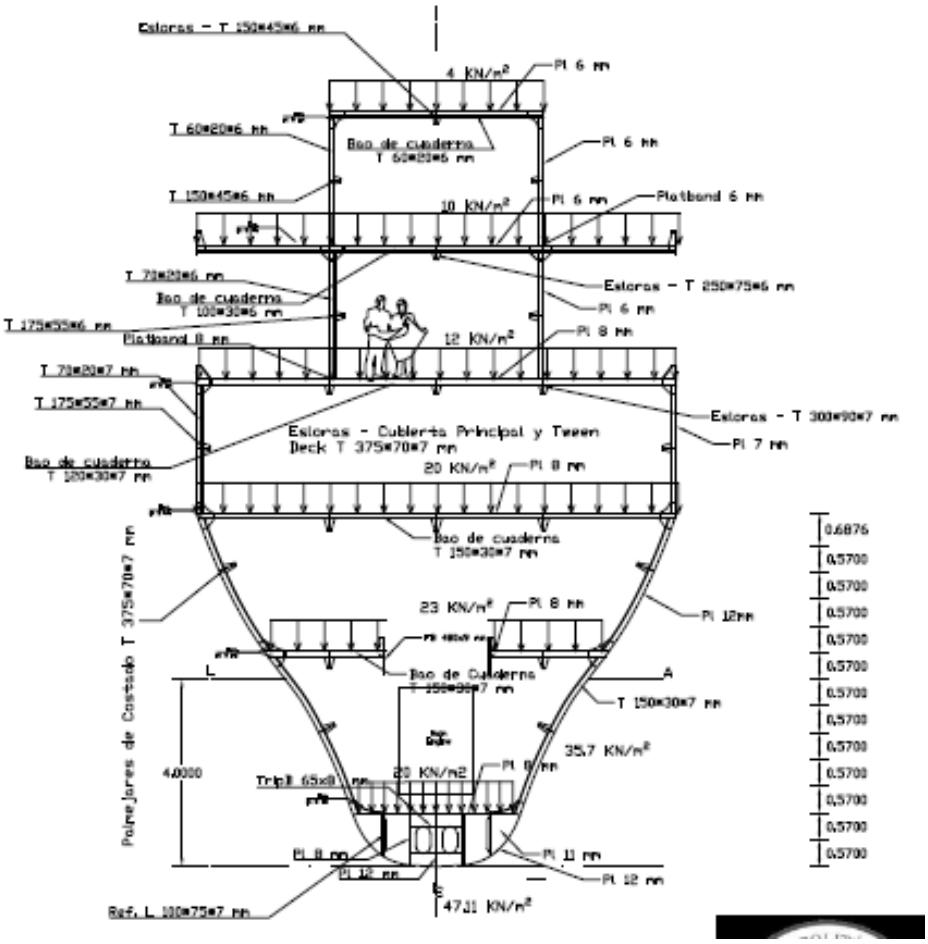
To calculate the equivalent load for variable distributed force, you have to apply the formulations presented in class in chapter III.

Progress control:

i. Nov. 15th, Monday: Implementation of computer program.

ii. Nov. 22nd, Monday: Discretization of system and equivalent loads.

Written report: maximum of 6 pages, without considering cover page and appendix. Format will be provided. Project grade: report 70% (Aesthetics, Completeness and clarity, and, Result analysis), oral presentation: 30% (Quality of graphic material, English pronunciation, and Response to questions).



To be completed by Wednesday Nov. 24th 8 am, when each group will present their project. Source codes must be included in the appendix, and the project with the data files also have to be uploaded in the Sidweb to be checked. Report must include duties and hours employed by each member to complete the project.

Jrml/2021