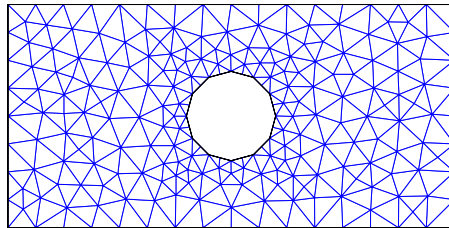


MECH 151 HT homework

A steel plate of indefinite size and 10 mm thickness is to be cooled by tubular coolant passages. Use 4mm diameter tubes spaced at 10mm on centers. The plot below represents a cross-section of the plate between symmetry planes (left and right edges).



Boundary conditions:

- Top: 100 w/m^2 flux
- Bottom: insulated
- Sides: “insulated” (symmetry cuts midway between coolant tubes).
- Hole: 20C fixed temp

A file is set up ready to run this problem: `hw7.m`. Do a design tradeoff study to minimize the hottest temperature subject to two constraints:

1. Space between the edge of a hole and either plate surface at least one hole diameter.
2. Space between coolant tube centers s at least three diameters.

Good luck achieving a “cool” design.