Master Thesis in Marine Technology - 2013

The Influence of Ice Classification on Design of an LNG Tanker

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Problem

It is estimated that 22% of the world's undiscovered petroleum resources are located in the Arctic, 84% projected to be offshore. Hence, this thesis concerns the LNG transport out of the arctic sea by means of a LNG tankers. Consequently, these LNG tankers have to comply with the ice conditions and the cold climate, because they define the operational window of the vessel as well as the cost to comply with the required ice class. Consequently, this thesis seeks to identify the influence of the target ice class on the hull production cost, steel structural weight and arrangement.

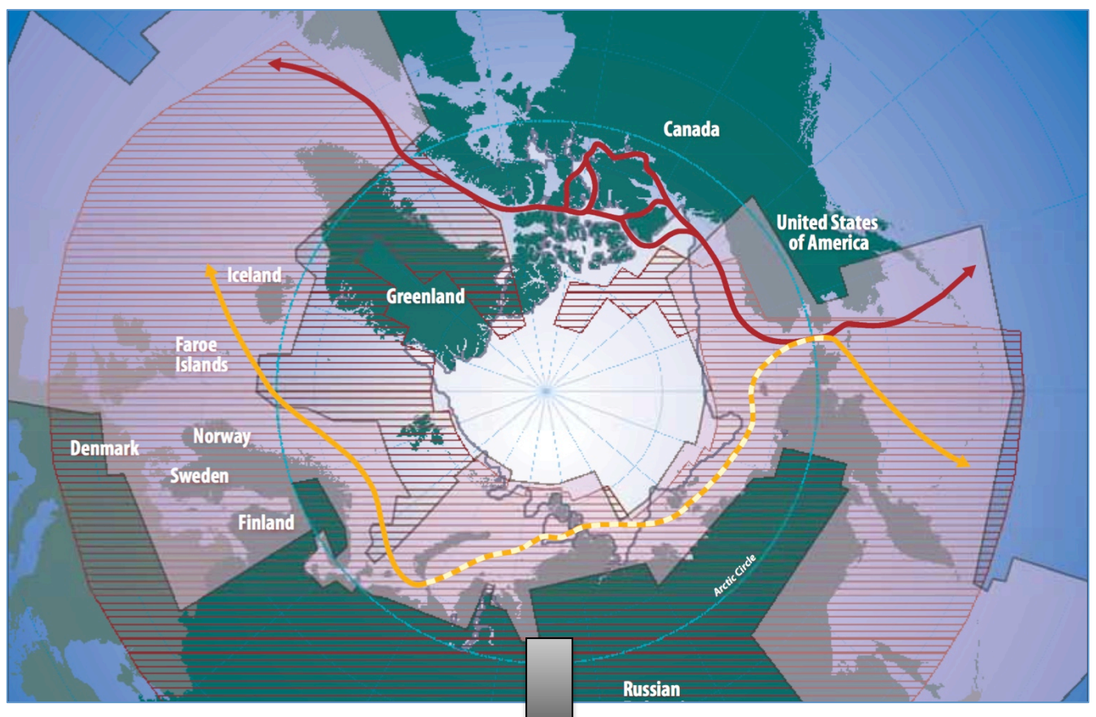
Introduction

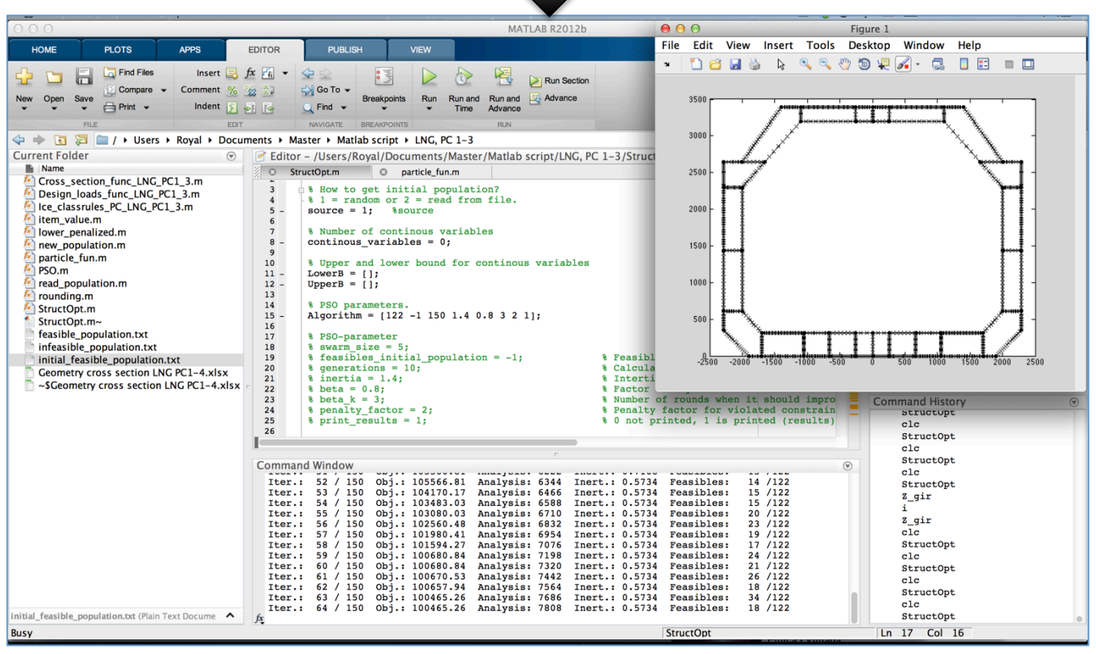
When a company is interested in acquiring an LNG tanker, one of the first orders of business is to decide upon a trade route and operational window. In terms of deciding this for an Arctic environment this will determine what sort of ice classification the vessel will have, which in turn will have an impact on the weight and cost of the ship.

The first part of this thesis gives background for relevant a case study in which future aspects of the climate is accounted for.

In the second part of the thesis a comparison between the targeted ice classes is performed. To expand upon the scope of the thesis, two classification societies is included in the comparison; The Russian Register Arctic Class rules and The Unified Requirements Polar Class Rules developed by IACS.

In order to perform this comparison as accurate as possible, a rule based analysis tool has been developed utilizing a particle swarm optimization method.





Conclusions

The outcome of this thesis is still under development, as there are still analysis to be made.

Acknowledgment: Professor Sören Ehlers and student David A. Molnes