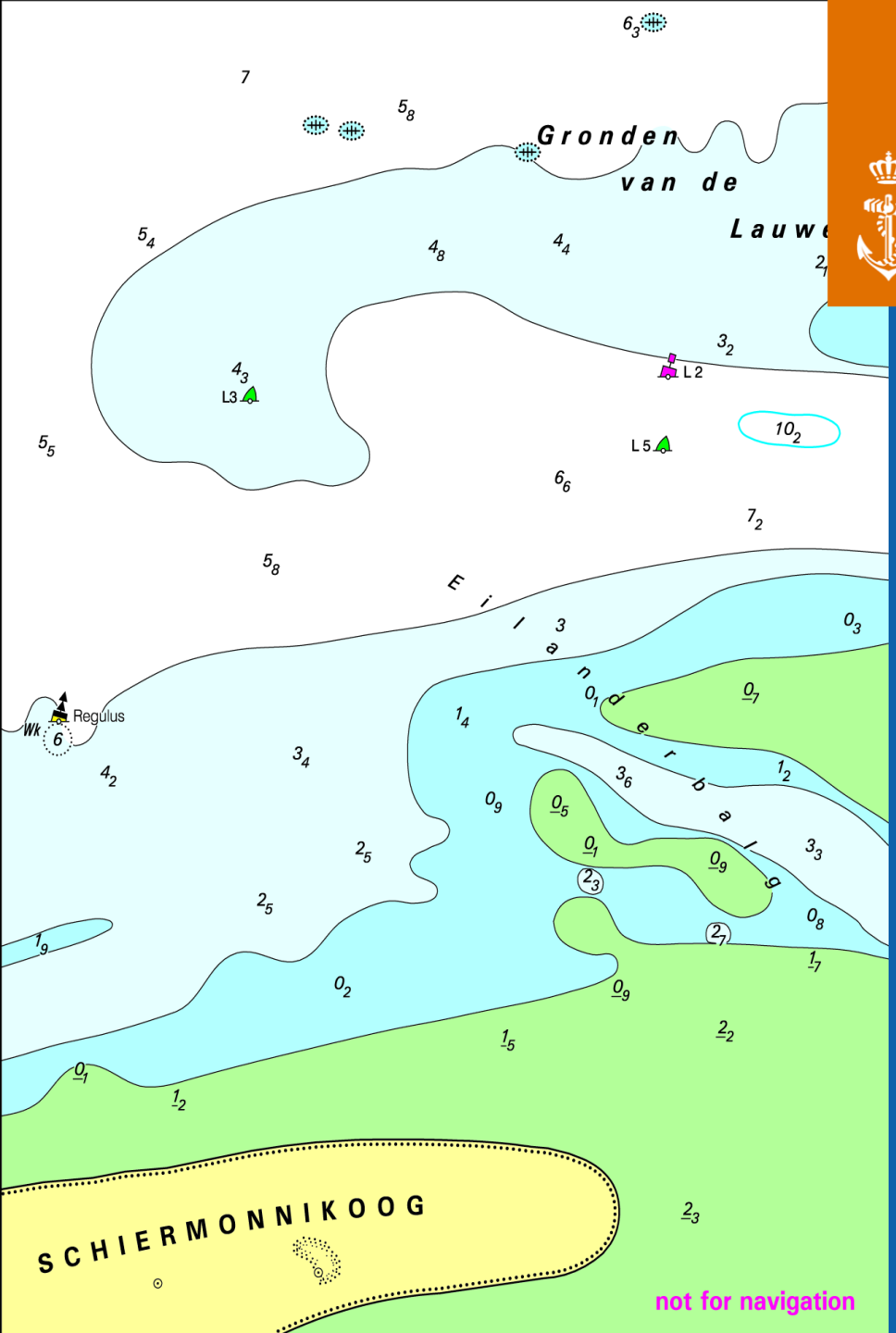

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Royal Netherlands Navy

AN ALGORITHMIC SOLUTION

TO THE RANDOMNESS OF EQUITABLE BOUNDARY LINES

Hydrographic Service

L.L. Dorst

26 October 2010

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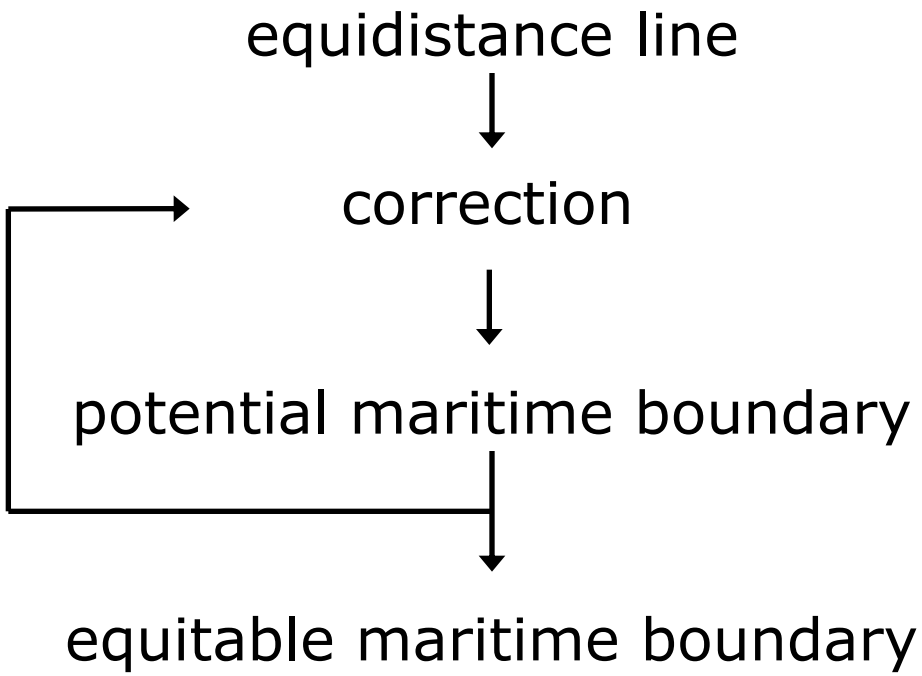
Introduction



Does the application of an algorithm have the potential to speed up this process?

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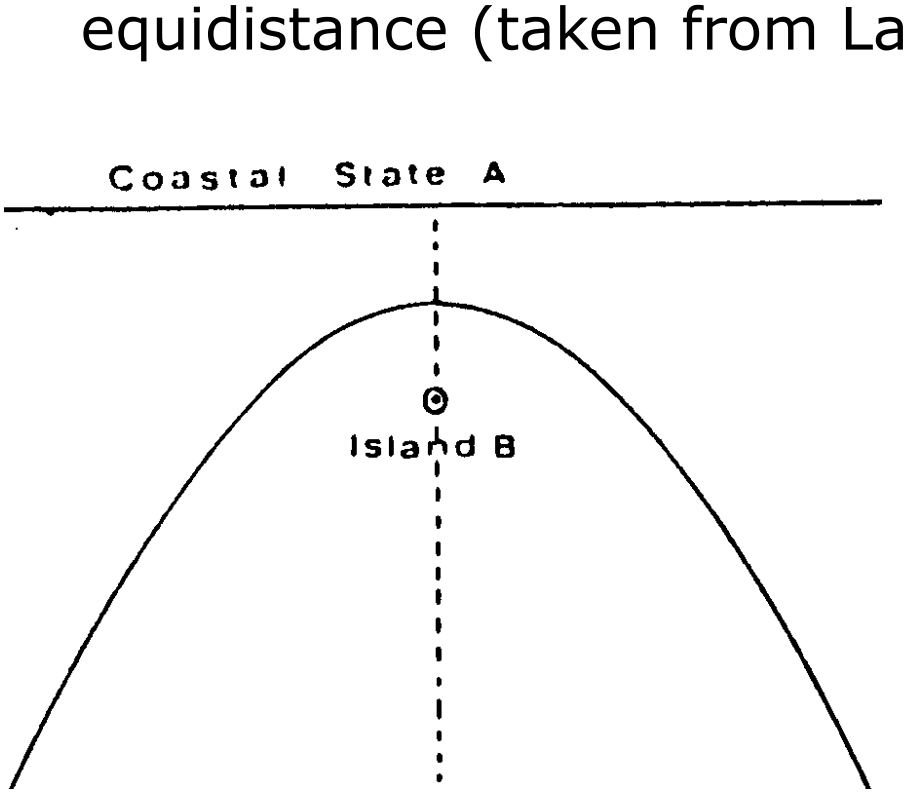
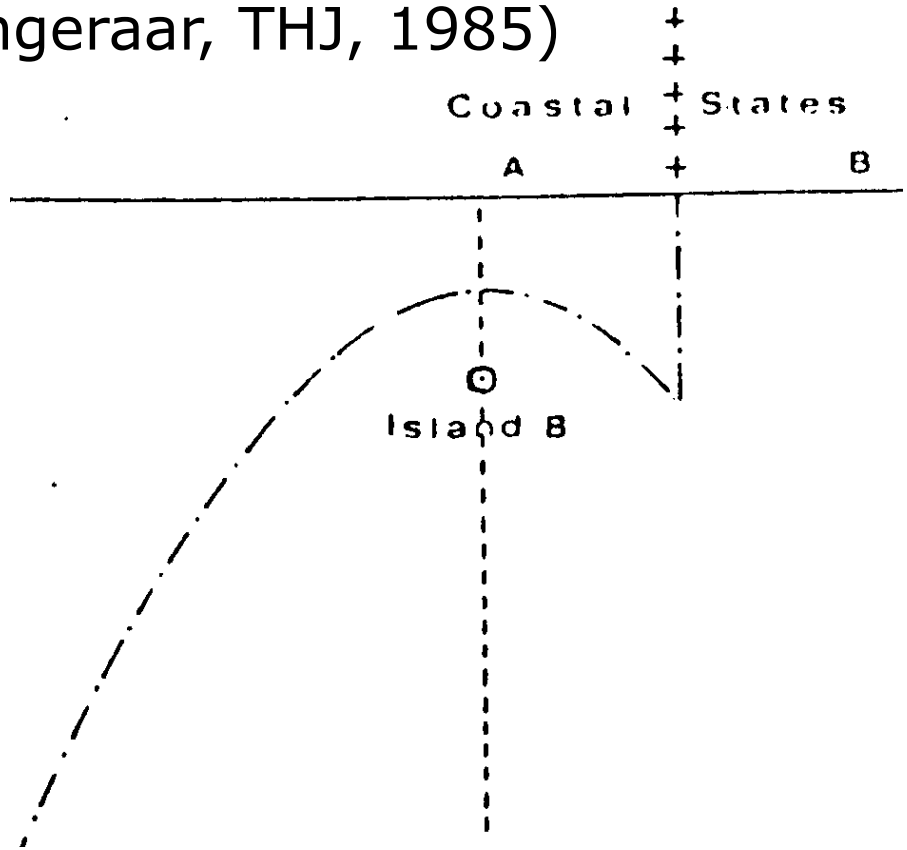
Methods for the construction of boundary lines

equidistance (taken from Langeraar, THJ, 1985)





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Methods for the construction of boundary lines

partial effect (taken from Langeraar, THJ, 1985)

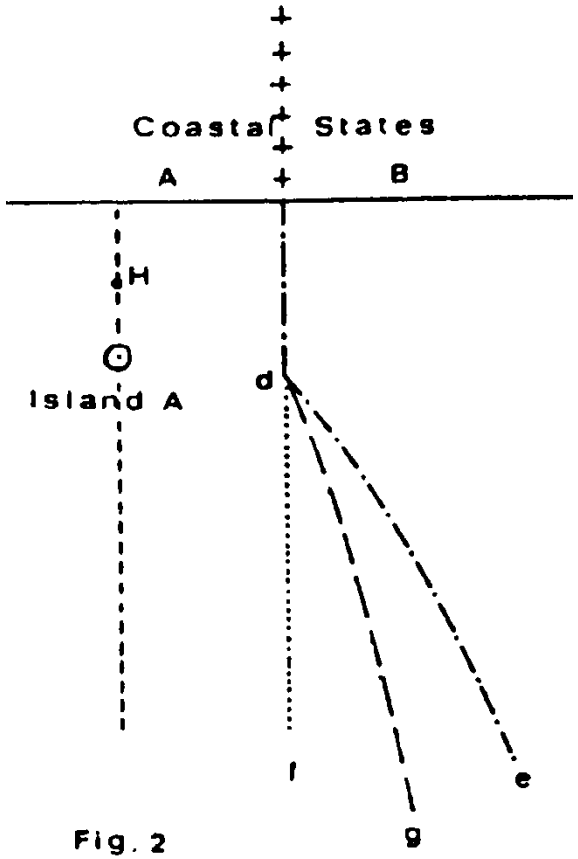

Fig. 2

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Methods for the construction of boundary lines

IHO/IAG S51: methods to correct equidistance lines:
partial effect (purely algorithmic);
notional base points (semi-algorithmic);
movement of the equidistance line (semi-algorithmic);
equiratio line (purely algorithmic);
bisector line (purely algorithmic).

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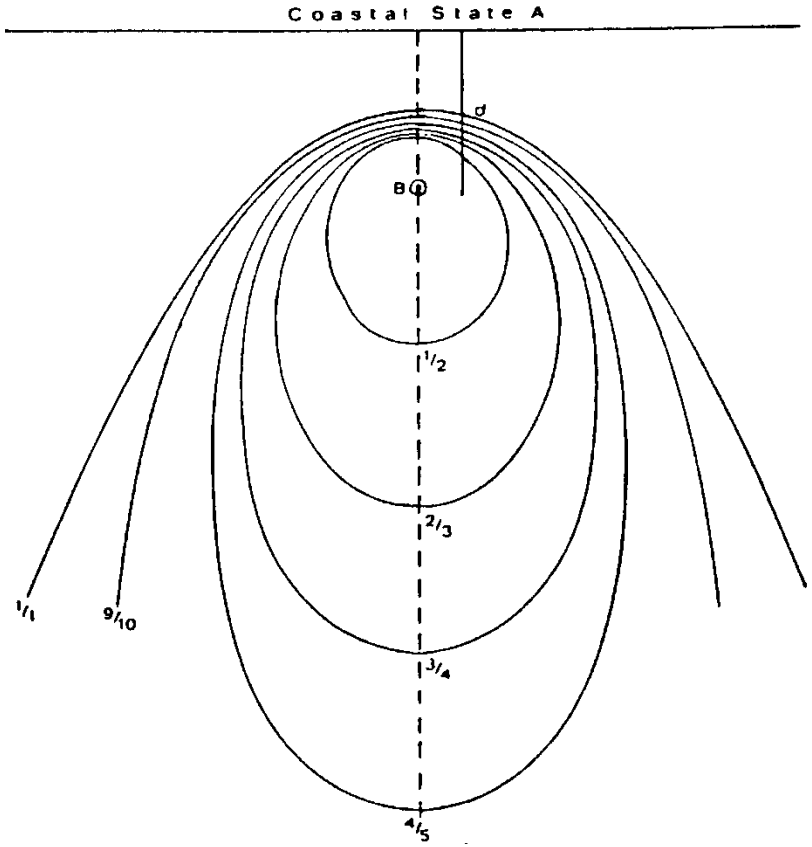
The equiratio method, and its simplification

(taken from Langeraar, THJ, 1985)



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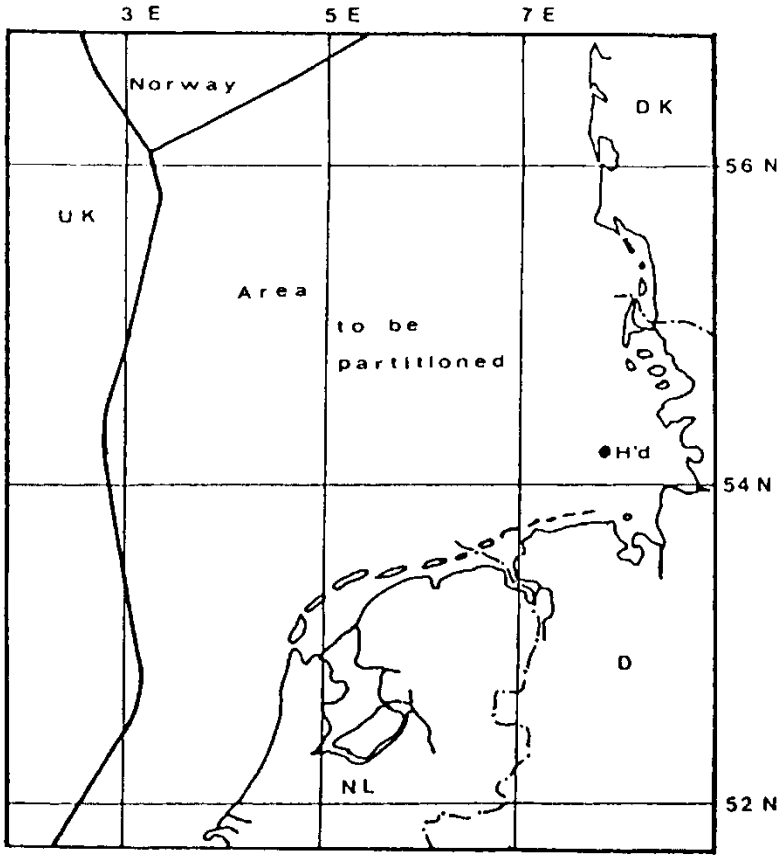
The equiratio method, and its simplification

(taken from Langeraar, THJ, 1989)



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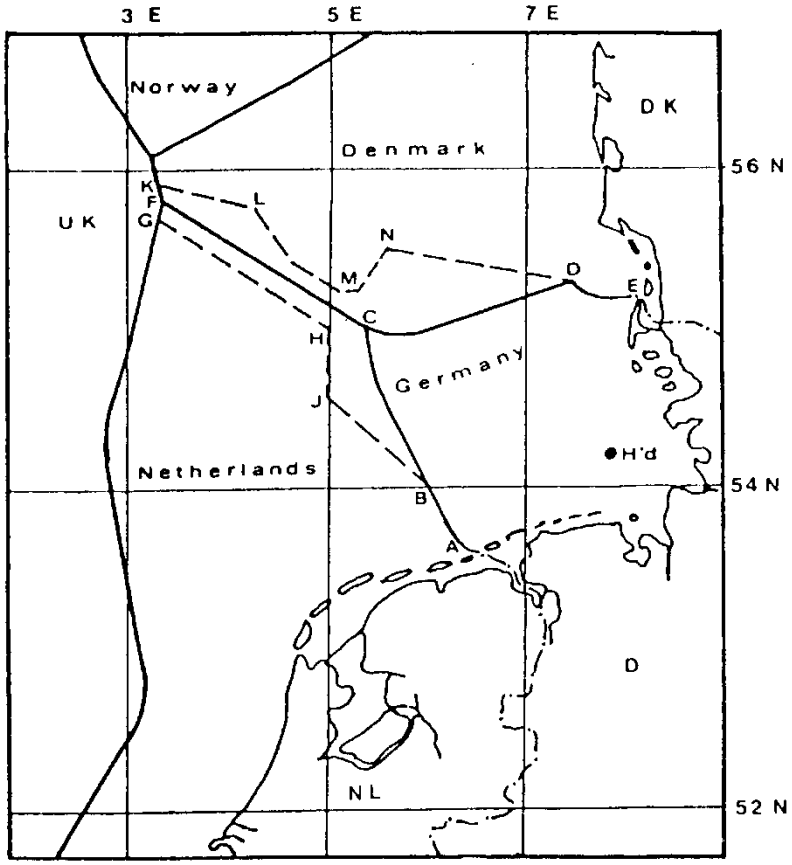
The equiratio method, and its simplification

(taken from Lageraar, THJ, 1989)



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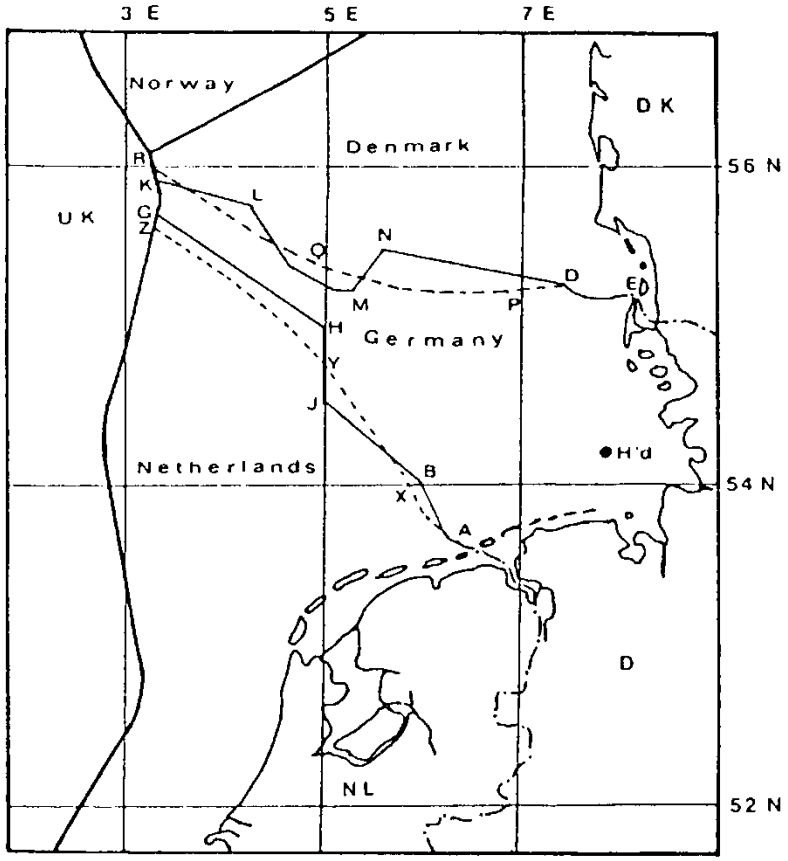
The equiratio method, and its simplification

(taken from Langeraar, THJ, 1989)



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The equiratio method, and its simplification

Lines between equiratio turning points: circle sectors.

How do we represent such lines in legal documents?
(a) graphical;
(b) approach by a large series of coordinates.

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The equiratio method, and its simplification

Why don't we start with equidistance, as usual,
and adapt only turning points to required ratio?

Allows for a short list of turning points,
in combination with a definition of straightness
for the connecting lines.

Equidistant turning points calculated by
three-point algorithm of Carrera (IHR, 1987).
Equiratio turning points require
only small adaptations.

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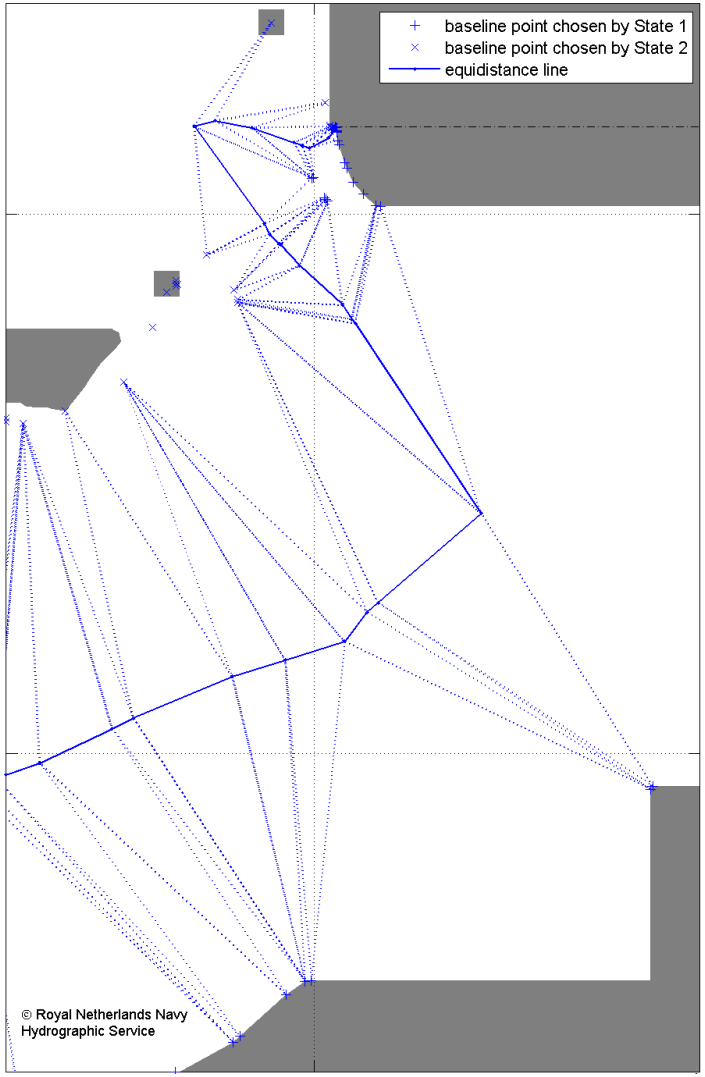
An example



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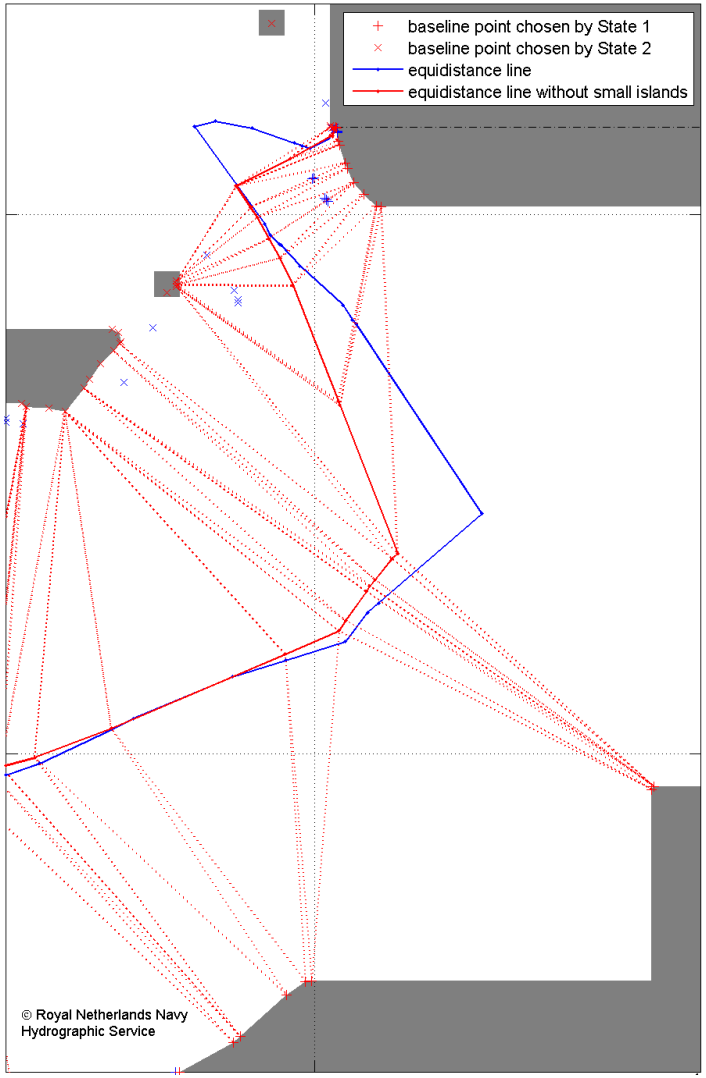

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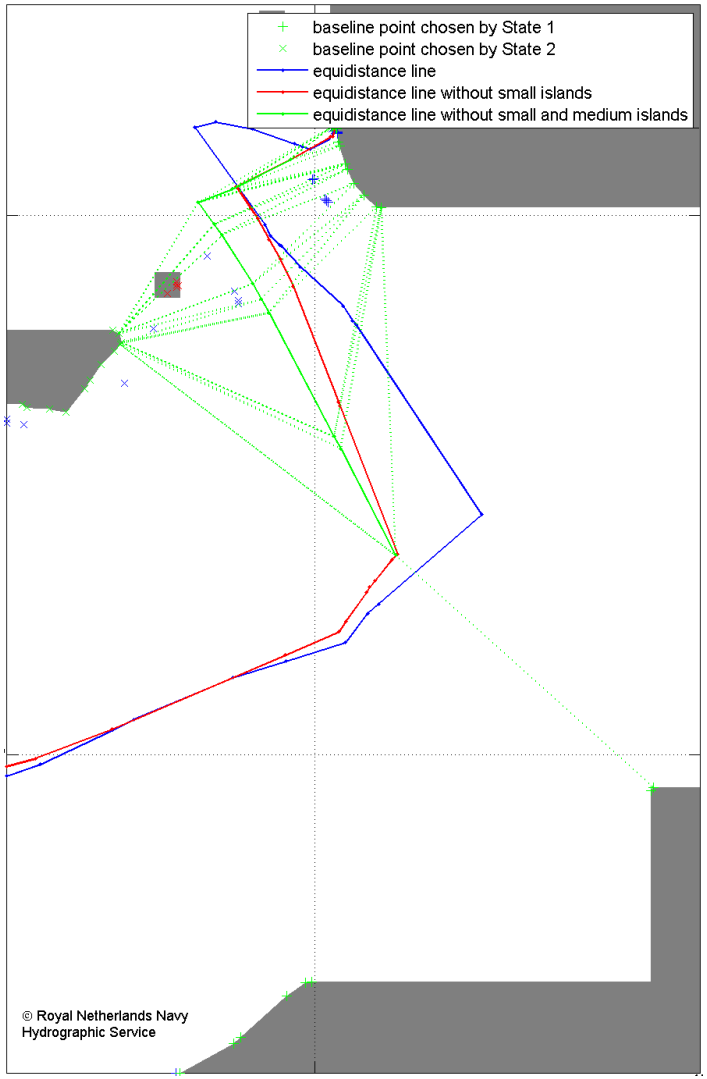

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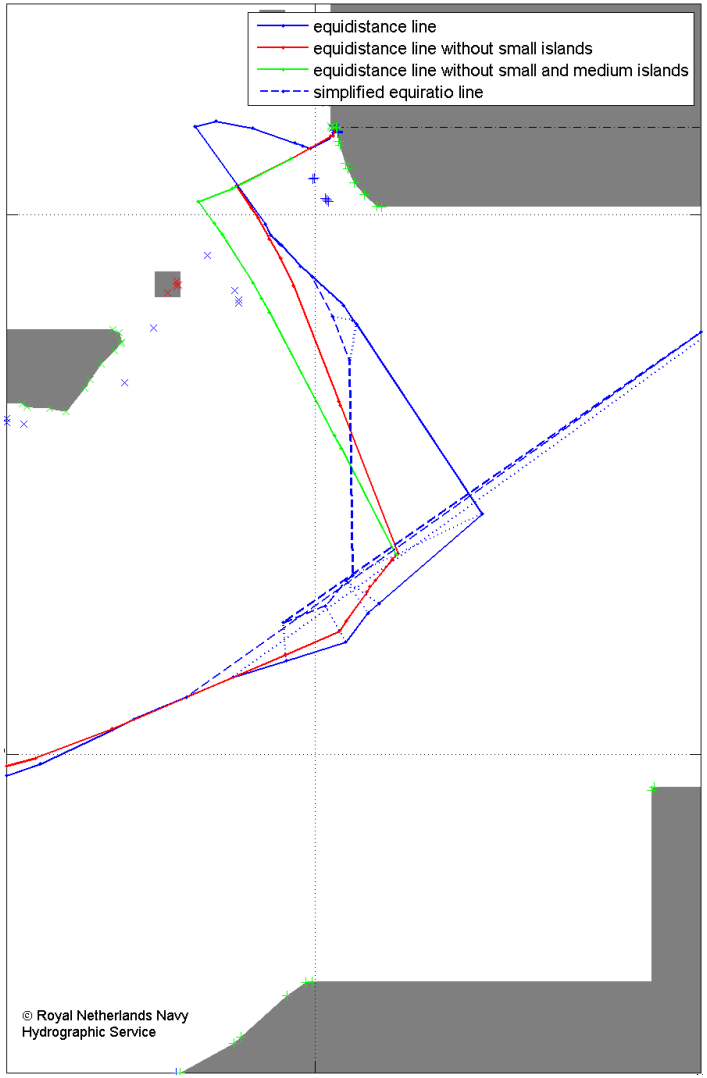

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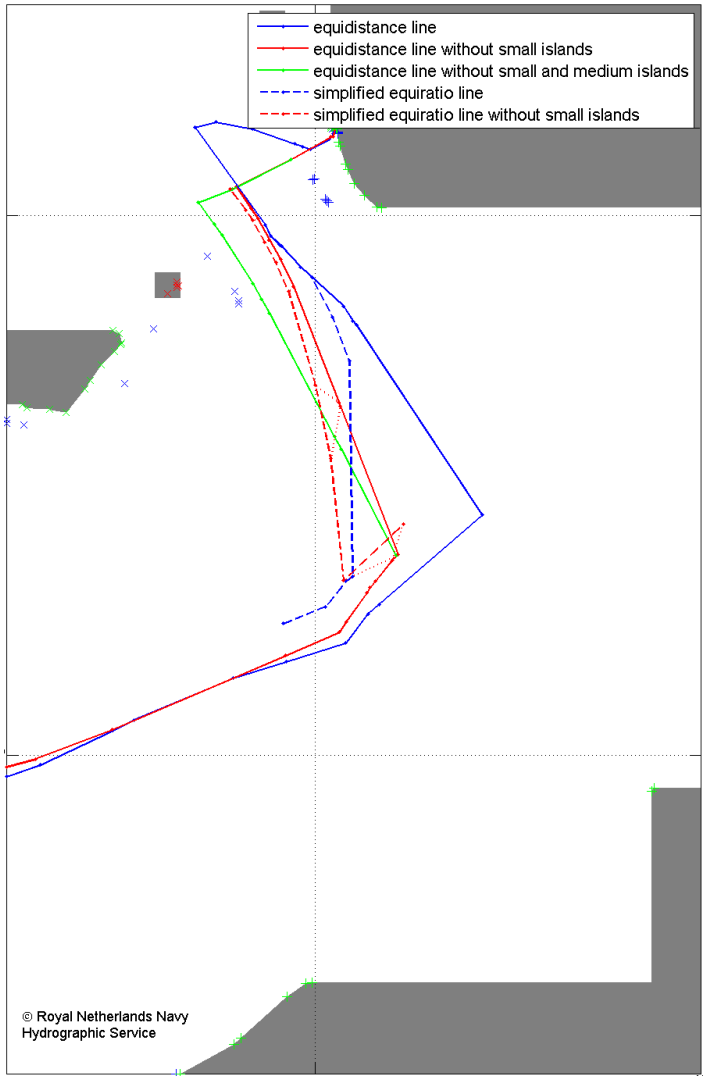

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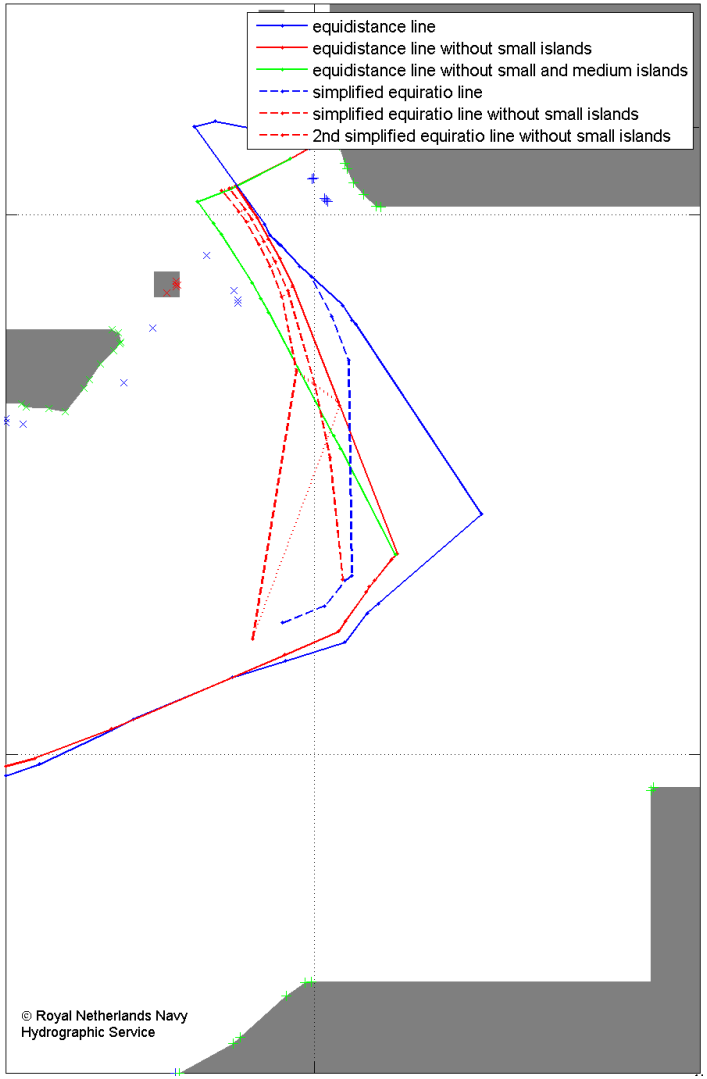

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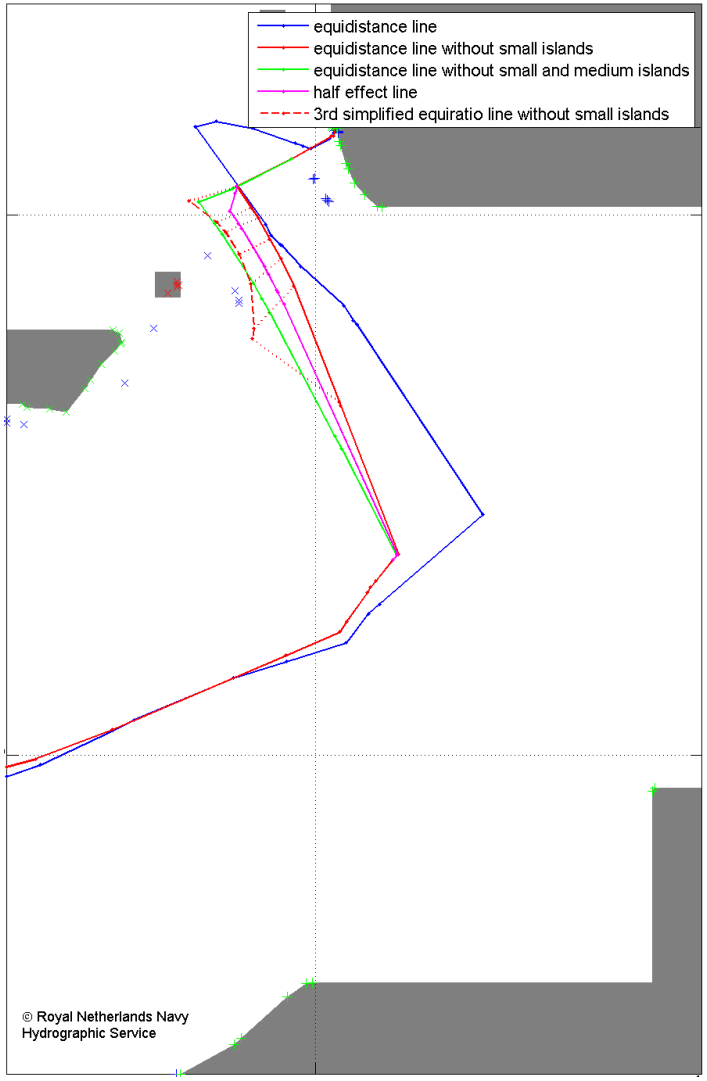

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Discussion

Equiratio offers firm algorithmic solutions to complicated boundary negotiation processes.

Simplified equiratio (SER) removes complexity of results.

Still, restrictions necessary to ratio assignment of base points.

SER is fully algorithmic, but not fully automatic.

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Conclusion

Contentious issues in maritime boundary delimitation processes are alleviated using advanced algorithmic methods, especially in case of islands of different sizes.

Add the simplified equiratio method (SER) to set of methods, because it combines flexibility with simplicity.

Not evident that results are free from erratic turning points.