

Modelling of Poroelastic Media with Localised Mass Inclusions

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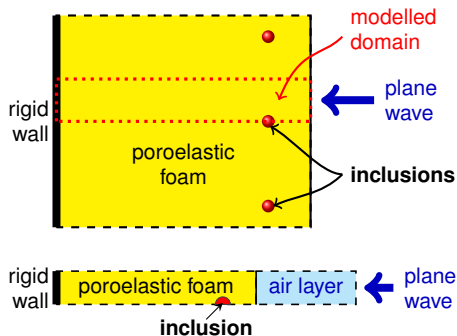
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Overview of the problem

Objective

To study the impact of small-size inclusions on sound absorption.



Approaches

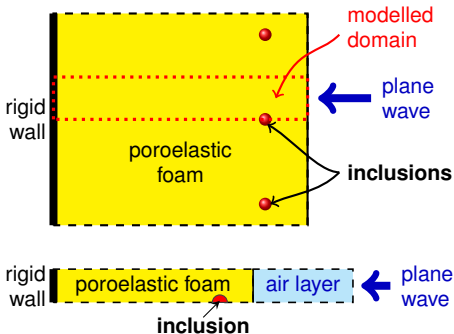
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- 1 single-layer configuration;
- 2 double-layer configuration.

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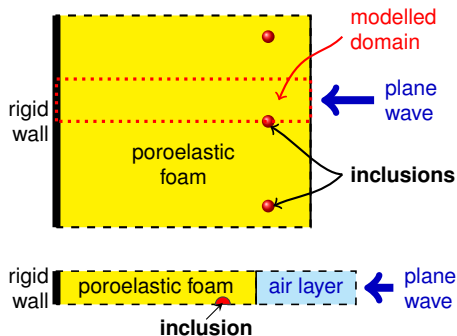
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- 3** with additional inertial terms in the weak formulation.

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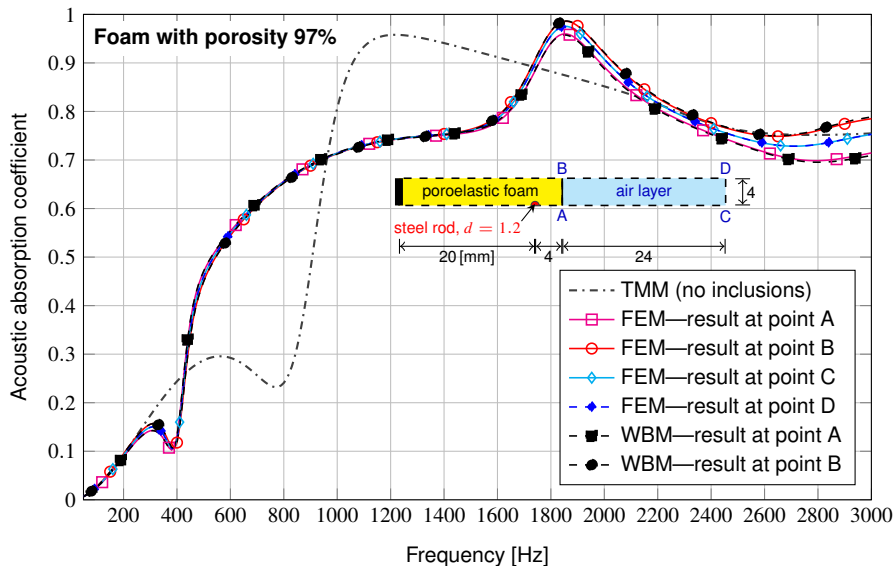
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Methods:

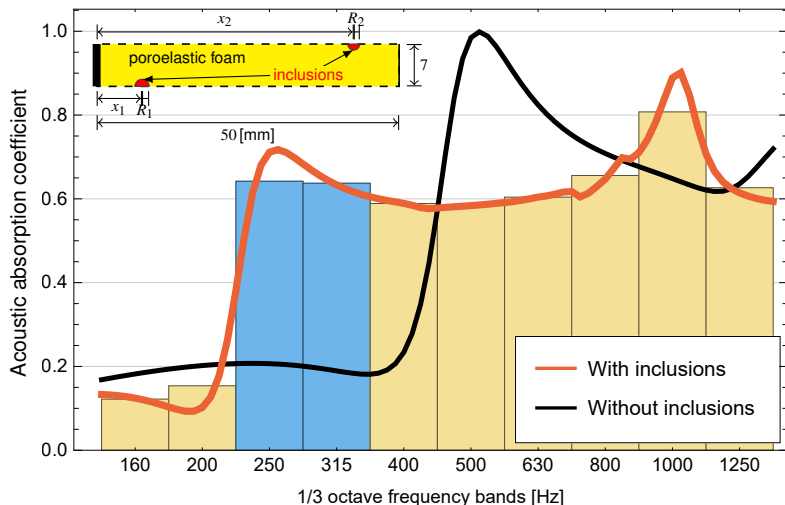
- 1 Finite Element Method (FEM);
- 2 Wave Based Method (WBM);
- 3 Transfer Matrix Method (TMM): analytical (no inclusions).

Modelling results



Optimisation results

Parameters found: $x_1 = 7.5$ mm, $R_1 = 1.18$ mm, $x_2 = 42.5$ mm, $R_2 = 1$ mm



Conclusions and acknowledgements

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- The addition of mass inclusions significantly enhances the acoustic absorption properties at low and medium frequencies;
- These effects seem to be very promising with respect to the development of wave absorbing composites.

Acknowledgements

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