

# Asymptotic expansions of highly conductive thin sheets

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Sensitive measurement and control equipment are protected from disturbing electromagnetic fields by thin shielding sheets. Alternatively to discretisation of the sheets, the electromagnetic fields are modeled only in the surrounding of the layer taking them into account with the so called Generalised Impedance Boundary Conditions.

We study the shielding effect by means of the model problem of a diffusion equation with additional dissipation in the curved thin sheet. We use the asymptotic expansion techniques to derive a limit problem, when the thickness of the sheet  $\varepsilon$  tends to zero, as well as the models for contribution to the solution of higher order in  $\varepsilon$ . These problems are posed in limit area of vanishing  $\varepsilon$  with condition for the jump of the solution and it's normal derivative, which avoid to mesh the computational domain, even locally, at the scale of  $\varepsilon$ .

For smooth sheets we derive the problems for arbitrary order and show their existence and uniqueness. Numerical experiments for the problems up to second order show the asymptotic convergence of the solution of right order in mean of the thickness parameter  $\varepsilon$ .

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