Weak Formulation of the 2D-Heat Equation

Jan Dezider Kees Koomen & Uri Cohen

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The 2D-heat equation we want to rewrite into weak form will be

$$c_1 \frac{\partial^2 T}{\partial t^2} = c_2 \frac{\partial^2 T}{\partial x^2} + c_3 \frac{\partial^2 T}{\partial y^2}$$

with c_1, c_2 and c_3 as constants which will be evaluated later on. This form of the time-dependent heat equations governs only the heat conduction in the object. Thus no radiation into the surroundings and internal heat generation.