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18.306 Advanced Partial Differential Equations with Applications
Fall 2009

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Lecture 24 2009 12 02 WED

TOPICS: Green's functions for signaling and source terms.
Heat equation examples. Generalized functions.

Continue with lecture #23. Heat equation $T_t = T_{xx}$ in 1-D.

Further examples

#6 Signaling problem in half space $x > 0$. T given at $x = 0$. No I.C.
-- Green's Function. Use symmetries. Reduce problem to solving ode.
#7 Signaling problems in an interval, with T or T_x given on one side, and T or T_x vanishing on the other.
-- Green's functions by method of images.

START WITH SOURCE TERMS: $T_t = T_{xx} + S$, homogeneous IC and BC.
Formulate problem.

To solve: re-interpret equation in terms of test functions.

DISTRIBUTIONS: functions as weights under the integral. Generalized functions: linear maps from test function onto constants. Examples: Delta function, Principal Value, Derivative of Delta function, etc.
Define derivatives of generalized functions.