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In this talk, we present sets of 4th order, compact finite-difference schemes of heat-conducting problems of one and multi-dimensions. All of these problems have Neumann boundary conditions.

Our sets of schemes are not only 4th order at all interior points, but also at the boundary points. Rigorous proofs are provided for solvability, stability and convergence properties. Numerical examples are also provided. (Received September 26, 2006)