

# Boundary element method for inverse source convection-diffusion problems

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In this study a numerical technique that combines the Boundary Element Method (BEM) with an iterative Sequential Quadratic Programming (SQP) procedure is developed in order to solve the inverse source problem associated with the steady-state convection-diffusion equation. This equation is intended to model the process of water pollution caused by point sources. Some boundary values for the concentration and/or its normal derivative are assumed to be known on each part of the boundary. The method also assumes the knowledge of the number of sources and therefore an *a-priori* estimation of this number has to be made. There are three possible cases, namely correct estimation, over estimation, or under estimation of the number of sources, and numerical results are presented for each of these cases. Different boundary conditions are considered and a discussion concerning the applicability of the method when the Péclet number is large is also presented.