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*Asymptotic behavior of diffusion and elasticity problems
in a thin cylinder fixed on a small part of one of its extremities*

This is joint work with J. Casado-Díaz and F. Murat.

We study the asymptotic behavior of the solutions of diffusion and elasticity problems in a cylinder whose diameter ε tends to zero. The Dirichlet condition is assumed to hold on the whole of one of its extremities, but only on a small part of size $\varepsilon r_\varepsilon$ (r_ε is tending to zero with ε) of the second one; the Neumann boundary condition is assumed on the remainder of the boundary. The result depends on r_ε . For diffusion problems, we prove there exists one critical size, namely $r_\varepsilon \approx \varepsilon$, and in total three different regimes; whereas for elasticity problems, there exist three critical sizes, namely $r_\varepsilon \approx \varepsilon^3$, $r_\varepsilon \approx \varepsilon$, and $r_\varepsilon \approx \varepsilon^{1/3}$, and in total seven different regimes. We obtain a corrector result for each behavior of r_ε .