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| Titolo | The Large Flux Problem to the Navier-Stokes Equations : Global Strong Solutions in Cylindrical Domains / / by Joanna Rencawowicz, Wojciech M. Zajczkowski |
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| Descrizione fisica | 1 online resource (176 pages) |
| Collana | Lecture Notes in Mathematical Fluid Mechanics, , 2510-1382 |
| Disciplina | 515.353 |
| Soggetti | Differential equations Continuum mechanics Functional analysis Differential Equations Continuum Mechanics Functional Analysis |
| Lingua di pubblicazione | Inglese |
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| Nota di contenuto | Introduction -- Notation and auxiliary results -- Energy estimate: Global weak solutions -- Local estimates for regular solutions -- Global estimates for solutions to problem on (v, p) -- Global estimates for solutions to problem on (h, q) -- Estimates for h_t -- Auxiliary results: Estimates for (v, p) -- Auxiliary results: Estimates for (h, q) -- The Neumann problem (3.6) in L^2 -weighted spaces -- The Neumann problem (3.6) in L^p -weighted spaces -- Existence of solutions (v, p) and (h, q) . |
| Sommario/riassunto | This monograph considers the motion of incompressible fluids described by the Navier-Stokes equations with large inflow and outflow, and proves the existence of global regular solutions without any restrictions on the magnitude of the initial velocity, the external force, or the flux. To accomplish this, some assumptions are necessary: The flux is close to homogeneous, and the initial velocity and the external force do not change too much along the axis of the cylinder. This is achieved by utilizing a sophisticated method of deriving energy |

type estimates for weak solutions and global estimates for regular solutions—an approach that is wholly unique within the existing literature on the Navier-Stokes equations. To demonstrate these results, three main steps are followed: first, the existence of weak solutions is shown; next, the conditions guaranteeing the regularity of weak solutions are presented; and, lastly, global regular solutions are proven. This volume is ideal for mathematicians whose work involves the Navier-Stokes equations, and, more broadly, researchers studying fluid mechanics.
