

1. Record Nr.	UNINA9911015633203321
Autore	Tezduyar Tayfun E
Titolo	Space–Time Computational Flow Analysis : A Chronological Catalog of Unconventional Methods and First-of-Its-Kind Solutions // by Tayfun E. Tezduyar, Kenji Takizawa
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Birkhäuser, , 2025
ISBN	3-031-88727-1
Edizione	[1st ed. 2025.]
Descrizione fisica	1 online resource (248 pages)
Collana	Modeling and Simulation in Science, Engineering and Technology, , 2164-3725
Altri autori (Persone)	TakizawaKenji
Disciplina	003.3
Soggetti	Mathematics - Data processing Mathematical models Quantum computers Computational Science and Engineering Mathematical Modeling and Industrial Mathematics Quantum Computing Teoria quàntica Ordinadors quàntics Estadística matemàtica Espai i temps Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Part I: Methods and Solutions in Finite Element Analysis -- Early Stabilized Methods -- Methods and Solutions in 1990-1994 -- Methods and Solutions in 1994-1999 -- Methods and Solutions in 2000-2004 -- Methods and Solutions in 2005-2009 -- Methods and Solutions in 2010-2015 -- Part II: Methods and Solutions in Isogeometric Analysis -- Methods and Solutions in 2010-2012 -- Methods and Solutions in 2013-2015 -- Methods and Solutions in 2016-2018 -- Methods and Solutions in 2019-2021 -- Methods and Solutions in 2022-2024 -- Concluding Remarks.
Sommario/riassunto	Space–Time Computational Flow Analysis (STCFA) was developed in

1990 in the context of flows with moving boundaries and interfaces, which is a wide class of problems that includes fluid–particle interactions, fluid–structure interactions (FSI), and free-surface and multi-fluid flows. It is a computational framework made of unconventional methods, which have evolved over the years as more unconventional methods were introduced to increase its scope and accuracy. It brought first-of-its-kind solutions in many classes of problems, including fluid–particle interactions in particle-laden flows, FSI in parachute aerodynamics, flapping-wing aerodynamics of an actual locust, ventricle-valve-aorta flow analysis, and car and tire aerodynamics. With these successes in so many classes of problems, the STCFA has reached a level of remarkable sophistication, scope, and practical value. This monograph presents, for the first time, a chronological catalog of STCFA methods and solutions from their development to the present. Part I focuses on the STCFA in the context of finite element analysis, and Part II in the context of isogeometric analysis. The methods presented include complementary general-purpose methods that were introduced in the evolution of STCFA. All researchers working on or interested in space–time computations in fluid mechanics, FSI, and solid mechanics, including graduate students, will benefit from the wealth of powerful computational methods and impressive solutions they will find in the book.
