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in this dissertation a method is proposed that identifies the mechanical properties of arteries in vivo the mechanical properties of an artery are linked to the development of cardiovascular diseases the possibility to identify the mechanical properties of an artery inside the human body could thus facilitate disease diagnostization treatment and monitoring supplied with information obtainable in the clinic typically limited to time resolved pressure radius measurement pairs the proposed in vivo parameter identification method solves a non convex minimization problem to determine parameters related to the mechanical properties of the blood vessel the artery is treated as a homogeneous incompressible residual stress free thin walled tube consisting of an elastin dominated matrix with embedded collagen fibers to validate the in vivo parameter identification method in silico arteries in the form of finite element models are created using published data for the human abdominal aorta with these in silico arteries which serve as mock experiments with pre defined material parameters and boundary

conditions in vivo like pressure radius data sets are generated the mechanical properties of the in silico arteries are then determined using the proposed parameter identification method by comparing the identified and the pre defined parameters the identification method is quantitatively validated and it is shown that the parameters agree well for healthy arteries furthermore the identified parameters are used to compare the stress state in the arterial model and in the in silico arteries the stress state is thereby decomposed into an isotropic and an anisotropic component which are primarily associated with the elastin dominated matrix and the collagen fibers respectively the comparison of the decomposed stress states shows a close agreement for arteries exhibiting a physiological stress gradient another important aspect is the identification of parameters by solving a non convex minimization problem the non convexity of the problem implies that incorrect parameter values corresponding to local minima may be found when common gradient based solution techniques are employed a problem specific global algorithm based on the branch and bound method is therefore created which ensures that the global minimum and accordingly the correct parameters are obtained it turns out that the gradient based solution technique identifies the correct parameters if certain requirements are met among others the use of the heuristic multi start method in a last step the in vivo parameter identification method is extended to also identify parameters related to smooth muscle contraction to prevent an overparameterization caused by the increased number of model parameters the model is simultaneously fit to clinical data measured during three different arterial conditions basal constricted and dilated despite the simple contraction model the extended method fits the clinical data well finally in this dissertation it is shown that the proposed in vivo parameter identification method identifies the mechanical properties of arteries well an open question for future research is how this method can be applied in a clinical setting to facilitate cardiovascular disease diagnostization treatment and monitoring

handbook of animal models in neurological disorders will better readers understanding of

a large variety of animal models and their applicability in studying a number of neurological disorders featuring sections on brain injury stroke and neuroinflammation this volume discusses in detail the utility success and pitfalls of multiple models for each condition multiple disorders are covered ranging from neurodegenerative diseases like alzheimer s parkinson s and als to multiple sclerosis headache migraine and others with expert authors this book has applicability for anyone pursuing neuroscience or biomedical research working to better understand study and ultimately treat neurological dysfunction summarizes animal models for a variety of neurological conditions contains chapter abstracts key facts a dictionary and a summary covers both neurodegenerative diseases and other neurological conditions compares and contrasts different models and experimental systems includes sections on alzheimer s parkinson s brain injury migraine multiple sclerosis and more

for over sixty years mcdonald s blood flow in arteries has remained the definitive reference work in the field of arterial hemodynamics including arterial structure and function with special emphasis on pulsatile flow and pressure prestigious authoritative and comprehensive this seventh edition has been totally updated and revised with many new chapters this edition continues to provide the theoretical basis required for a thorough understanding of arterial blood flow in both normal and pathological conditions while keeping clinical considerations and readability paramount throughout key features the definitive reference work on arterial hemodynamics fully updated and revised to cover all recent advancements in the field

conn s handbook of models for human aging second edition presents key aspects of biology nutrition factors affecting lifespan methods of age determination use in research and the disadvantages advantages of use using a multidisciplinary approach this updated edition is designed as the only comprehensive current work that covers the diversity in aging models chapters on comparative models explore age related diseases

including alzheimer s joint disease cataracts cancer and obesity also included are new tricks and approaches not available in primary publications this must have handbook is an indispensable resource for researchers interested in the mechanisms of aging gerontologists health professionals allied health practitioners and students combines both the methods of study for human aging and animal models provides a historical overview and discussion of model availability key methods and ethical issues contains over 200 full color illustrations

in 1996 and with extraordinary prescience panfilov and holden had highlighted in their seminal book computational biology of the heart that biology was potentially the most mathematical of all sciences fast forward 20 years and we have seen an explotion of applications of mathematics in not only biology but healthcare that has already produced significant breakthroughs not imaginable more than 20 years ago great strides have been made in explaining through quantitative methods the underlying mechanisms of human disease not without considerable ingenuity and effort biological mechanisms are bewildering complex ever evolving multi scale variable difficult to fully access and understand this poses immense challenges to the computational physiology community that nevertheless has developed an impressive arsenal of tools and methods in a vertiginous race to combat disease with the tall order of improving human healthcare mechanistic models are now contending with the advent of machine learning in healthcare and the hope is that both approaches will be used synergistically since the complexity of human patophysiology and the difficulty of acquiring human datasets will require both deductive and inductive methods this research topic presents work that is currently at the frontier in computational physiology with a striking range of applications from diabetes to graft failure and using a multitude of mathematical tools this collection of articles represents a snapshot in a field that is moving a dizzying speed bringing understanding of fundamental mechanism and solutions to healthcare problems experienced by healthcare systems all over the world

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one of kind textbook provides comprehensive tutorial on cranial anatomy with step by step text and visuals dissection in the anatomical laboratory is a mandatory component of training for neurosurgeons acquisition of highly technical skills is a long and arduous task requiring knowledge of complex surgical anatomy and basic steps for single surgical approaches unlike dense textbooks operative cranial neurosurgical anatomy by filippo gagliardi cristian gragnaniello pietro mortini and anthony caputy provides readers with a user friendly tutorial on cranial approaches clearly delineated through concise written instructions and serial images essential procedural aspects are discussed in 53 chapters starting with sections on pre surgical training and planning patient positioning and basic techniques subsequent sections detail cranial approaches transpetrosal approaches endonasal transoral and transmaxillary procedures vascular procedures and ventricular shunts procedures surgical technique fundamentals and basic variants including surgical anatomy and landmarks are highlighted in 500 figures and illustrations key features summaries graphics and schematic drawings provide immediate access to salient information to utilize during surgical dissections and for surgical preparation a wide spectrum of cranial procedures covered in 23 chapters from the precaruncular approach

to the medial orbit and central skull base to surgical anatomy of the petrous bone diverse endonasal procedures including sublabial transphenoidal modified lothrop odontoidectomy and endoscopic endonasal transmaxillary vascular procedures such as middle cerebral artery bypass and internal maxillary artery bypass this reader friendly handbook is a must have resource for every neurosurgical resident and an excellent refresher for all neurosurgeons it will help residents and fellows optimize the time and quality of practical training in the cadaver lab learn fundamental surgical techniques in cranial neurosurgery and thoroughly prepare for cranial neurosurgical cases

the first and best primer for the cardiovascular interventionalist updated with more than twenty new chapters and all new q a a doody s core title for 2021 filling a crucial gap in procedural knowledge this groundbreaking reference was the first to focus on interventional cardiovascular procedures interventional cardiology second edition includes a completely updated section on procedures as well as chapters on the necessary scientific foundation to which specialists will refer every day in their clinical practice in addition each procedural chapter is enhanced by valuable tips and pitfalls from an internationally recognized group of experts the comprehensive coverage of this groundbreaking resource is highly accessible thanks to a well organized full color format that synthesizes important information and provides a consistent template in describing each procedure throughout the book charts and tables help to summarize key concepts and can serve as the basis for a detailed overview features new to this edition multiple choice questions with answers at the end of most chapters 21 new chapters including history of interventional cardiology publishing interventional cardiology research based learning medical simulation in interventional cardiology emerging clinical applications of physiologic and intravascular imaging tools an overview of mitraclip procedure cell therapy for cardiovascular disease and more edited by some of the foremost experts in the field and featuring contributions from key opinion leaders in interventional cardiology top to bottom coverage of the latest interventional cardiology techniques valuable

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the definitive guide to sonography in obstetrics and gynecology thoroughly updated and enhanced by the addition of teaching cases doody s core titles for 2021 this acclaimed guide is a clinically relevant reference text an atlas and a teaching learning resource presented in full color and enriched by more than 2 000 illustrations it expertly examines the full spectrum of disorders and conditions likely to be encountered in gynecologic and maternal fetal care you will find expert all inclusive coverage of everything from sonographic operating instruments and screening the fetal patient for syndromes and anomalies to diagnosing the female patient for cysts infertility and incontinence this edition has been updated to include coverage of the latest procedures and diagnostic guidelines for the use of sonography in ob gyn including 3d and 4d us and enhanced image processing contrast enhanced sonography ultrasound guided fetal therapy sonographic evaluation of pelvic pain and much more the eighth edition also features an extensive series of teaching cases each case consists of the patient s medical history representative us images cineloop videos q a and teaching points with references fleischer s sonography in obstetrics gynecology eighth edition opens with general obstetric sonography covering such pivotal topics as normal pelvic anatomy and fetal echocardiography before moving into fetal anomalies and disorders risk assessment and therapy including first trimester screening and amniocentesis are explored in the next section while the remaining parts of the book focus on maternal disorders gynecologic sonography and the newest complementary imaging modalities

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