Abstract

The developed computer software system is particularly suitable for three dimensional investigations of hemodynamic conditions in abdominal aortic and carotid artery bifurcation aneurysms. It consists of two major clinically relevant modeling scope; rigid wall and deformable wall models. It provides an integrated set of tools that help solve clinically relevant hemodynamic variables such as velocity, wall shear stress and pressure profiles that aids in predicting disease development. The developed graphical user interface is essential for creating mathematical models of an aneurysm with prescribed boundary and initial conditions. This user-friendly interface automatically performs geometric model constructions, input data preparations, model discretizations, computational modeling and post-processing options of the aneurismatic models. The blood flow dynamics is defined according to the incompressible Navier-Stokes and the continuity equations for viscous fluids. The computational modeling technique is based on finite element method. Because of the increasing size and complexity of the analysis and the software system design to date, a change in the programming approach and a shift in software design strategy have been proposed for developing readable, expandable and maintainable software systems. This change is from the procedure-oriented to
object-oriented programming system development methodologies.

References

Specialized Finite Element Analysis Computer Software for Modeling Hemodynamics in Abdominal Aortic and Carotid Artery Bifurcation Aneurysms


Index Terms

Computer Science

Bio-medical Sciences

Keywords

Computer software  object-oriented programming  three dimensional finite element analysis  hemodynamic  abdominal aortic aneurysm  carotid artery bifurcation aneurysm