A GRAPHICAL USER INTERFACE OF BLOOD FLOW THROUGH A MULTI-IRREGULAR STENOSED ARTERY

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A mathematical model of blood flow through a multi-irregular stenosed artery is developed and visualized using the Graphical User Interface (GUI) in MATLAB. The flow of blood is assumed to be two-dimensional, unsteady, laminar, incompressible and axisymmetric. The streaming blood has been considered to be a Newtonian blood flow. The governing equations of motion accompanied by an appropriate boundary conditions are solved numerically using MAC (Marker and Cell) method in cylindrical coordinate system in staggered grids. The pressure-Poisson equation was then solved by using the successive-over-relaxation (SOR) method. The pressure drop gives higher values and the separation region is found to be larger in the case of blood flowing through a flexible artery having multiple irregular stenosis when compared to blood flowing through a single irregular stenosed artery. The numerical results of the blood flow characteristics such as axial and radial velocities, flow rate and wall shear stress under the influence of multiple stenosis is then visualized using GUI. The results show that, the flow rate and wall shear stress have lower values compared to the velocity profiles which has the higher values with lower Reynolds number and vice versa.

THE CONJUGATE GRAPH AND CONJUGACY CLASS GRAPH OF METACYCLIC 2-GROUPSOF ORDER AT MOST 32

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A groupis called metacyclic if it has a cyclic normal subgroup such that the quotient groupis also cyclic. The classificationof non-Abelian metacyclic p-groups of class two has been found by earlier researcher, which is partitioned into two families of non-isomorphic p-groups. The conjugacy classes of these groups are then applied into graph theory. The conjugate graph is a graph whose the vertices are non-central elements of a finite non-Abelian group. Besides, the conjugacy class graph is a graph whose vertices are non-central of a group that is two vertices are connected if their cardinalities are not coprime, in which their greatest common divisor between the vertices is not equal to one.In this study, the conjugacy classes of the metacyclic 2-groups of order at most 32 have been obtained using the definition of conjugacy classes and their group presentations.The conjugate graph and conjugacy class graph of metacyclic 2-groups of order at most 32 are found directly using the definition. These conjugate graph and conjugacy class graph are then used to determine some graph properties such as chromatic number, clique number, dominating number and independent number. The conjugate graph of the groups turned out to bea line graph, meanwhile the conjugacy class graph of the groups turned out to be a complete graph.