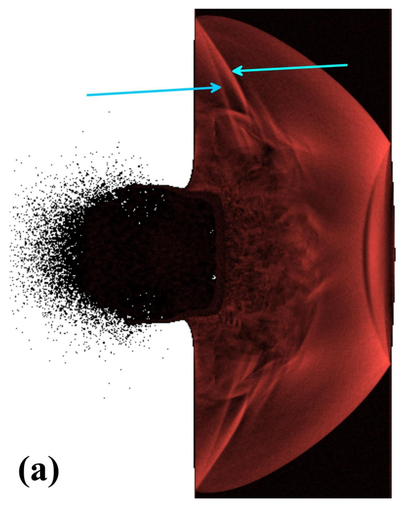
Transport Phenomena: The Art Of Balancing Free Download



If you are not enrolled in that course yet, you might want to enroll. It will give you a background on Transport Phenomena. Introduction There are three very important concepts in the study of fluid mechanics, momentum, energy and mass. Momentum is conserved. Energy is conserved. Mass is conserved. Momentum is easy to understand. It is a vector quantity that tells us the average speed and direction of a fluid at a point. Energy is a scalar quantity and tells us how much kinetic energy a fluid has in motion. It is the energy that allows us to predict what the speed will be if we let the air go out of a balloon. Mass is another scalar quantity. Mass tells us how much is in a fluid at a point. It is important to notice that mass does not change if the fluid is moving. Mass is conserved. In fluid mechanics, momentum, energy and mass are balanced as the air flows out of the balloon. If you study the conservation of these three physical quantities, the air flow out of the balloon. Momentum Momentum is a vector quantity. It has three components. These three components are called x-direction, y-direction and z-direction. Momentum is conserved when it is not changing with time. It can be expressed in a mathematical form as follows: Let us explain these terms. Total Momentum: The total momentum is the sum of momentum vectors from all parts of the fluid system. x-direction Momentum: x-direction momentum is defined as This means the total momentum is divided by the fluid volume in the x-direction. y-direction Momentum: y-direction momentum is defined as This means the total momentum is divided by the fluid volume in the y-direction. z-direction Momentum: z-direction momentum is defined as This means the total momentum is divided by the fluid volume in the z-direction. The conservation of momentum is written as follows: y-direction momentum equals the x-direction momentum z-direction momentum equals the x-direction momentum We say that if these two equations are true at a time t, it will be true at a later time. That is, if the momentums are the same, it will be true at a later time. If these two equations are not true, 520fdb1ae7