Playground

Abdelrahman

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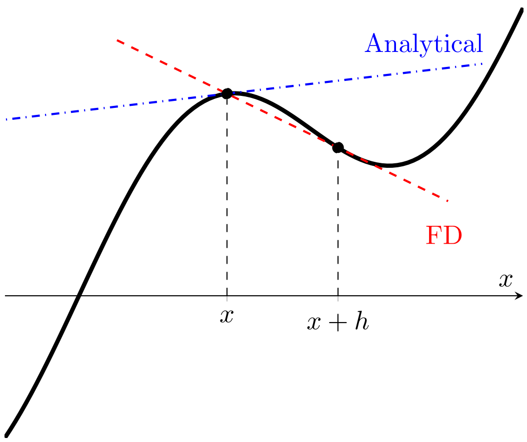

Figure 1: Forward Finite Difference

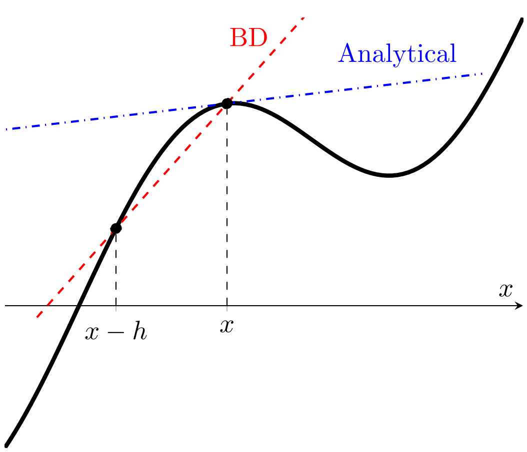

Figure 2: Backward Finite Difference

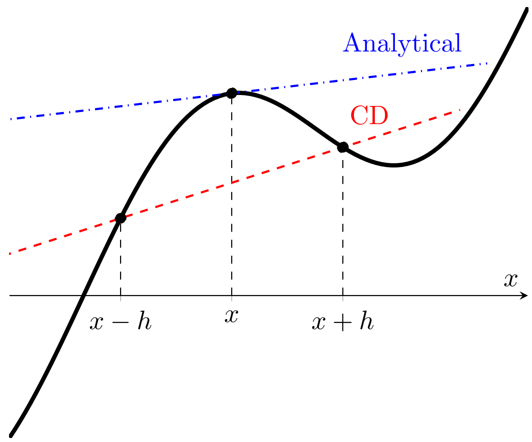

Figure 3: Central Finite Difference

Assumptions	
Steady & Fully developed $\Rightarrow$ 1	$\frac{\partial}{\partial t} = 0$, $\frac{\partial}{\partial x} = 0$
No-Slip Condition $\Rightarrow$ 2	$\mathbf{u}(x,0) = \mathbf{0}$, $\mathbf{u}(x,d) = \begin{bmatrix} U \\ 0 \end{bmatrix}$
Constant Pressure $\Rightarrow$ 3	$\frac{\partial p}{\partial x} = 0$, $\frac{\partial p}{\partial y} = 0$
Newtonian Fluid	constant viscosity (ν)
Incompressible	constant density (ρ)
Laminar & Purely axial	$v = 0$

Assumptions	
Steady & Fully developed $\Rightarrow$ 1	$\frac{\partial}{\partial t} = 0$, $\frac{\partial}{\partial x} = 0$
No-Slip Condition $\Rightarrow$ 2	$\mathbf{u}(x,0) = \mathbf{0}$, $\mathbf{u}(x,d) = \mathbf{0}$
Constant Pressure $\Rightarrow$ 3	$\frac{\partial p}{\partial x} = -G$, $\frac{\partial p}{\partial y} = 0$
Newtonian Fluid	constant viscosity (ν)
Incompressible	constant density (ρ)
Laminar & Purely axial	$v = 0$

Assumptions	
Steady & Fully developed $\Rightarrow$ 1	$\frac{\partial}{\partial t} = 0$, $\frac{\partial}{\partial x} = 0$
No-Slip Condition $\Rightarrow$ 2	$\mathbf{u}(x,y,z) = \mathbf{0} \iff \sqrt{y^2+z^2} = R$
Constant Pressure $\Rightarrow$ 3	$\frac{\partial p}{\partial x} = -G$, $\frac{\partial p}{\partial y} = 0$, $\frac{\partial p}{\partial z} = 0$
Newtonian Fluid	constant viscosity (ν)
Incompressible	constant density (ρ)
Laminar & Purely axial	$v = 0$, $w = 0$

References