5. Third-Order Partial Differential Equations

1. $\dfrac{\partial w}{\partial t}+\dfrac{\partial^3 w}{\partial x^3}-6w\dfrac{\partial w}{\partial x}=0.$ *Korteweg–de Vries equation.*

2. $\dfrac{\partial w}{\partial t}+\dfrac{\partial^3 w}{\partial x^3}-6w\dfrac{\partial w}{\partial x}+\dfrac{1}{2t}w=0.$ *Cylindrical Korteweg–de Vries equation.*

3. $\dfrac{\partial w}{\partial t}+\dfrac{\partial^3 w}{\partial x^3}+6\sigma w^2\dfrac{\partial w}{\partial x}=0.$ *Modified Korteweg–de Vries equation.*

4. $\dfrac{\partial w}{\partial t}+\dfrac{\partial^3 w}{\partial x^3}+f(w)\dfrac{\partial w}{\partial x}=0.$ *Generalized Korteweg–de Vries equation.*

5. $\dfrac{\partial w}{\partial y}\dfrac{\partial^2 w}{\partial x\partial y}-\dfrac{\partial w}{\partial x}\dfrac{\partial^2 w}{\partial y^2}=\nu\dfrac{\partial^3 w}{\partial y^3}.$ *Hydrodynamic boundary layer equation.*

6. $\dfrac{\partial w}{\partial y}\dfrac{\partial^2 w}{\partial x\partial y}-\dfrac{\partial w}{\partial x}\dfrac{\partial^2 w}{\partial y^2}=\nu\dfrac{\partial^3 w}{\partial y^3}+f(x).$
Boundary layer equation with pressure gradient.

