4. Other Second-Order Partial Differential Equations

4.1. Equations of Transonic Gas Flow

1. $a\dfrac{\partial w}{\partial x}\dfrac{\partial^2 w}{\partial x^2}+\dfrac{\partial^2 w}{\partial y^2}=0.$ *Equation of steady transonic gas flow.*

2. $\dfrac{\partial^2 w}{\partial y^2}+\dfrac{a}{y}\dfrac{\partial w}{\partial y}+b\dfrac{\partial w}{\partial x}\dfrac{\partial^2 w}{\partial x^2}=0.$ *Equation of steady transonic gas flow.*

4.2. Monge–Ampere Equations

1. $\left(\dfrac{\partial^2 w}{\partial x\partial y}\right)^2-\dfrac{\partial^2 w}{\partial x^2}\dfrac{\partial^2 w}{\partial y^2}=0.$ *Homogeneous Monge–Ampere equation.*

2. $\left(\dfrac{\partial^2 w}{\partial x\partial y}\right)^2-\dfrac{\partial^2 w}{\partial x^2}\dfrac{\partial^2 w}{\partial y^2}=A.$ *Nonhomogeneous Monge–Ampère equation.*

3. $\left(\dfrac{\partial^2 w}{\partial x\partial y}\right)^2-\dfrac{\partial^2 w}{\partial x^2}\dfrac{\partial^2 w}{\partial y^2}=f(x,y).$ *Nonhomogeneous Monge–Ampere equation.*

