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Subject : Differential equation

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- Application of ODE's and PDE's in Engineering;

Over the last hundred years, many techniques have been developed for the solution of Ordinary differential equations and Partial differential equations while quite a major portion of these techniques solve major problems only in Academic process, there are some which, which are important in the solution of real problems arise from science and engineering.

as it is impossible to cover all of these for this time period. but I will mention following commonly used methods which are vastly used for engineering purpose.

- ★ Tricomi equation;

$$y^2 \frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$$

$\begin{cases} y > 0; & \text{elliptic} \\ y < 0; & \text{hyperbolic} \end{cases}$

\* Laplace equation (or variants);  
$$\frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} = \nabla^2 \phi = 0$$

\* Poisson's equation;  
$$\frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} = f(x, y)$$

\* Helmholtz equation:  $\frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} + c^2 \phi = 0$

There are so many other ODE and PDE equations that can help solve major engineering problems faced by engineers.