04 November 14

Engineering Mathematics Mid-term Exam

1. Find the solution of the initial-value problem, $x^{2}y^{'}=xy^{'}+2x-1 , y(-1)=2ln2$, and state whether it is unique or not. (20%)
2. Reduce the given system to the Echelon form. (20%)

$$\begin{matrix}1&2&3\\1&-2&3\\2&0&6\end{matrix}\begin{matrix} 4&-1\\ -2& 1\\ 2& 0\end{matrix}$$

$$\begin{matrix} 1& 1& 1\end{matrix}\begin{matrix} 1& 1\end{matrix}$$

$$\dot{x}=x+4y$$

$$\dot{y}=x+y$$

Solve the given coupled differential equations (Think as an eigenvalue problem). (30%)

1. A body of mass, *m*, is dropped from rest, at time *t=0*, with its displacement *x(t)* measured down from the point of release, the equation of motion is $m\frac{d^{2}x}{dt^{2}}=mg $, where *g* is the acceleration of gravity and *t* is the time (Free-fall problem). (30%)

