Practical 1: Solving and plotting first order differential equations

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(%i4) diff(sin(x),x);  /* it differentiates first argument w.r.t second vari
```

$$(\%o4)\quad \cos(x)$$

```
(%i10) 'diff(y,x);   /* single quote will tell maxima that y is dependent on
```

$$(\%o10)\quad \frac{d}{dx}\,y$$

```
(%i11) eqn: 'diff(y,x) = x^2; /*the differential equation has been given the
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$$(\%o11)\quad \frac{d}{dx}\,y = x^2$$

```
(%i16) sol: ode2(eqn,y,x); /* ode2 is a predefined function for solving ODE
of order upto 2, sol is the name given to the general solution*/
```

$$(\%o16)\quad y = \frac{x^3}{3} + \%c$$

```
(%i20) psol: ic1(sol,x=0,y=1); /*ic1 stands for initial condition 1,
psol is a particular solution*/
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$$(\%o20)\quad y = \frac{x^3+3}{3}$$

```
(%i22) a: ic1(sol, x=0,y=k);
```

$$(\%o22)\quad y = \frac{x^3+3\,k}{3}$$

```
(%i23) psol1: ev(a,k=-2); /*it evaluates a by replacing k=-2*/
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$$(\%o23)\quad y = \frac{x^3-6}{3}$$

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psol2: ev(a, k=1);
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(%o25) $$y=\frac{x^3+3}{3}$$

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psol3: ev(a, k=0);
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(%o26) $$y=\frac{x^3}{3}$$

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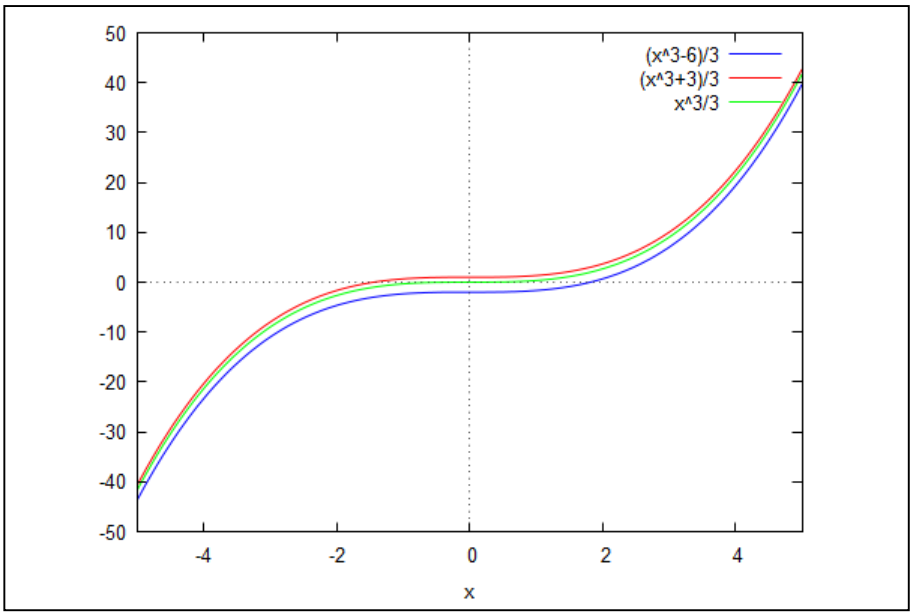
wxplot2d([rhs(psol1),rhs(psol2),rhs(psol3)],[x,-5,5]);
```

(%t40)



(%o40)