Lecture 27 Review

Maxima introduction

Evaluating Expressions & Digression

```
maxima> Fib[0] : 0;
maxima> Fib[1] : 1;
maxima> Fib[n] := Fib[n-1] + Fib[n-2];
maxima> Fib[45]/Fib[44];
```

Digression on golden ratio.

What do you see? Maybe not what you want.

Try this:

```
maxima> ev(%o45,float);
```


Note:

```
maxima> fib[0] : 5;
maxima> fib[1] : 8;
maxima> fib[n] := fib[n-1] + fib[n-2];
maxima> fib[45]/fib[44];
maxima> ev(%,float);
```

Maxima 1st order ODE Solutions

Solve 1st order ODEs, e.g., $x^2y' + 3xy = \sin(x)/x$

```
maxima> x^2*'diff(y,x) + 3*x*y = sin(x)/x;
```

or

```
maxima> x^2*diff(y(x),x) + 3*x*y(x) = sin(x)/x;
```

```
maxima> ode2(x^2*'diff(y,x) + 3*x*y = sin(x)/x, y, x);
```

Need to specify initial conditions

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```
maxima> soln1:ode2(x^2*'diff(y,x) + 3*x*y = sin(x)/x, y, x);
maxima> ic1(soln1, x=1, y=1);
```

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Maxima 2nd order ODE Solutions

Solve 2nd order ODEs, e.g., $\frac{d^2}{dx^2}y + y = 4x$

```
maxima> eqn2: diff(y,x,2) + y = 4*x;
maxima> soln2: ode2(eqn2, y, x);
```

Need to specify initial conditions

```
maxima> ic2(soln2, x=0, y=1, diff(y,x)=3);
```

also

```
maxima> bc2(soln2, x=0, y=3, x=2, y=1);
```

Summary

More experience with `maxima`

Don’t suffer in silence. Scream for help!!!