Pendulum equation and solution for small oscillations.

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Lecture 5

Homework for week-1

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- An idle question "why don't we have 0, negative and complex roll numbers ? If we want to devise them what are your suggestions?"
- Note that numbers are just labels for the real life information we want to deal with.

- Consider the small angle approximation of the pendulum equation,

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- Write the general solution of the equation in terms of cosine and sine and write the arbitrary coefficients in terms of initial position $\theta(0)$ and initial velocity $\frac{d\theta}{dt}|_{t=0}$.

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- Use $e^{\pm i\theta} = cos\theta \pm isin\theta$ to rewrite the solution in terms of $\cos$ and $\sin$ functions.
- Use the initial conditions to evaluate the arbitrary constants in the solution.
- Note that g and l are system parameters defined in the equation, the constants of motion on the other hand are defined in terms of initial conditions.

- Write the expression of Amplitude in terms of system parameters and initial values.

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- Find the time period T by insisting that as $t \to t + T$, the solution does not change.