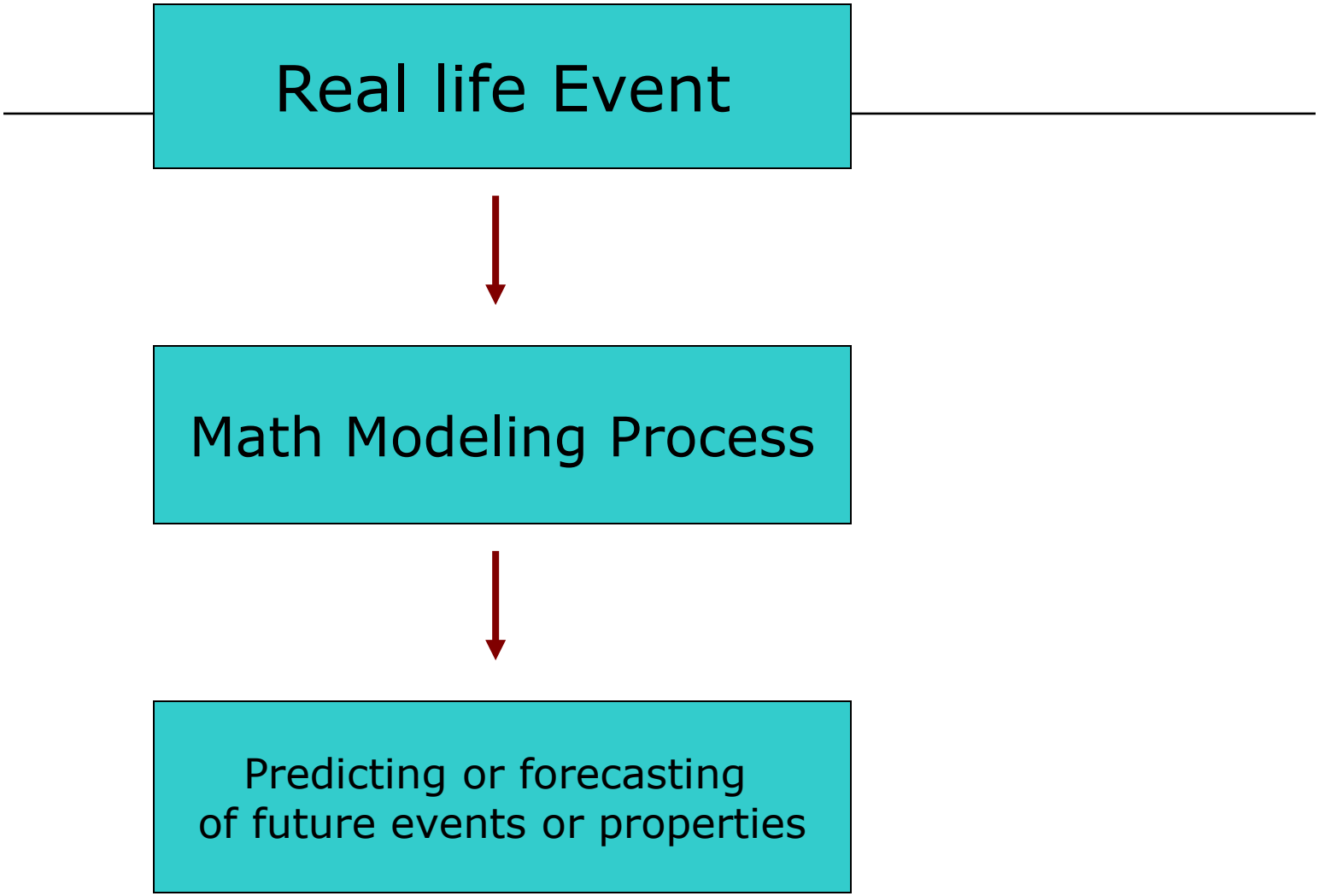
Introduction to Mathematical Modeling

Introduction: Math Modeling

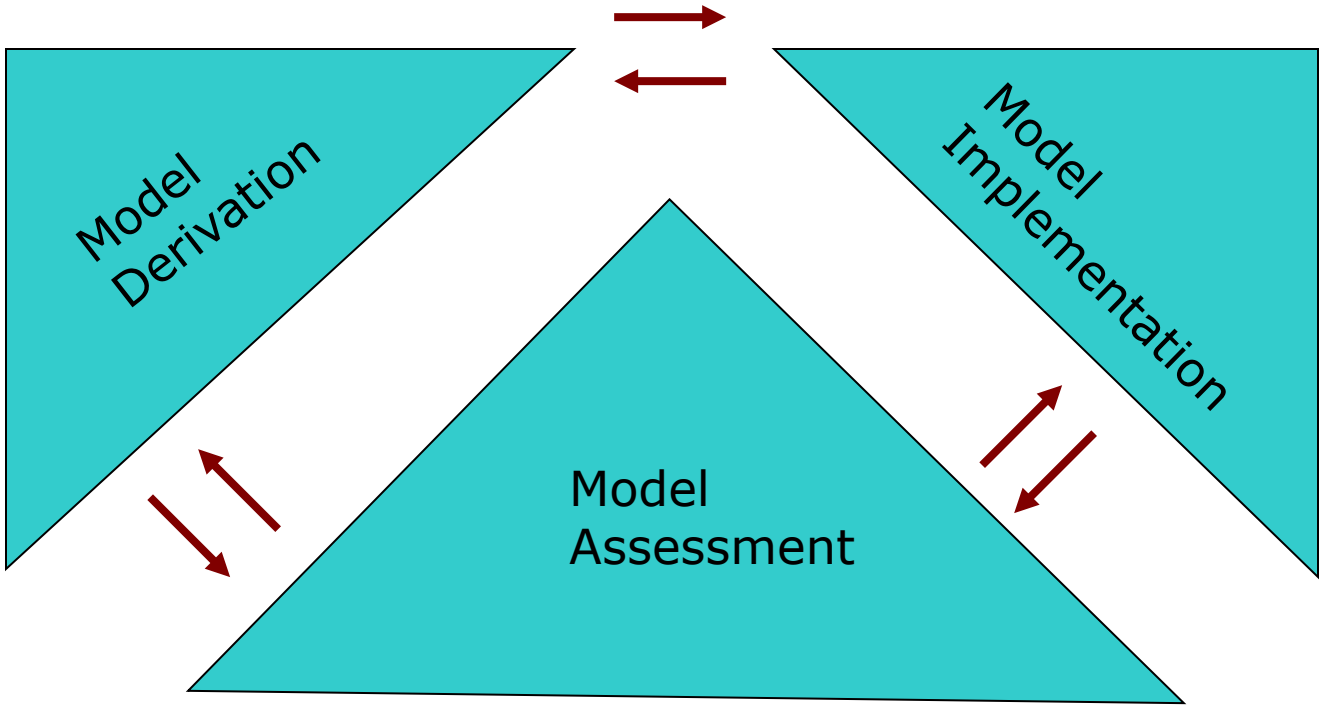
Real-life event in the form of some observation that happens naturally or a consequent of something else.

Examples:

- Ripples in a pond due to winds
- Stars twinkle?
- Why the moon hasn’t fallen to the Earth?


Real life Event
Math Modeling Process
Predicting or forecasting
of future events or properties

Math Modeling Process



Model Derivation

- Idea here is to come up with mathematical formulations to describe the physical phenomenon

a) Inquire information about the problem

Books Journals

Internet Ask!!

b) Beware of existing models

c) Determine the contributing factors such as parameters, variables, etc.

i) identify all possible variables

ii) eliminate nonessential ones

d) Rely on existing physical laws and relationships

Model Implementation

- Carry out the math formulation via a computer simulator or a laboratory experiment.

Model Assessment

- Test for violation
- Test for consistency
- Validate Results
- Perform Comparisons

Remarks

1. Make simple models
2. Improve model as we advance
3. Not everything can be modeled