

# CMSC460: Computational Methods

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These are my notes for UMD's CMSC460: Computational Methods. These notes are taken live in class ("live- $\text{\TeX}$ -ed). This course is taught by Professor Haizhao Yang. The textbook for the course is *A First Course in Numerical Methods* by OU Ascher and Chen Greif.

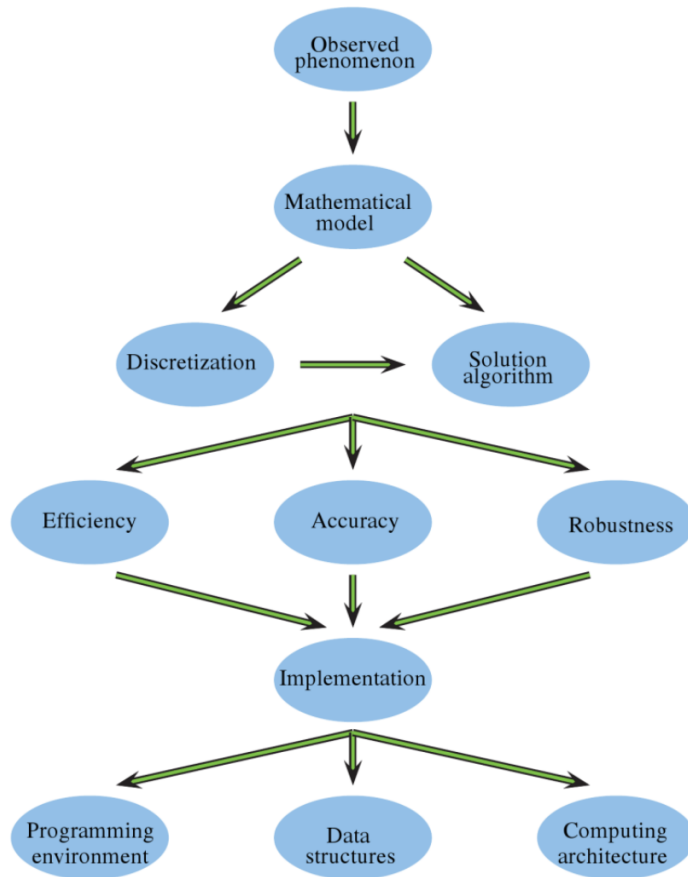
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## §1 Scientific Computing



**Figure 1.1.** *Scientific computing.*

**Definition 1.1** (Relative and Absolute Errors). Let the target value be  $u \in \mathbb{R}$  and let the numerical solution be  $v \in \mathbb{R}$ , then the **absolute error** is  $|u - v|$  and the **relative error** is  $\frac{|u-v|}{|u|}$ .

**Note 1.2.** If  $|u|$  is large, then relative error is used and if  $|u|$  is very small, then relative error is not a good measurement.