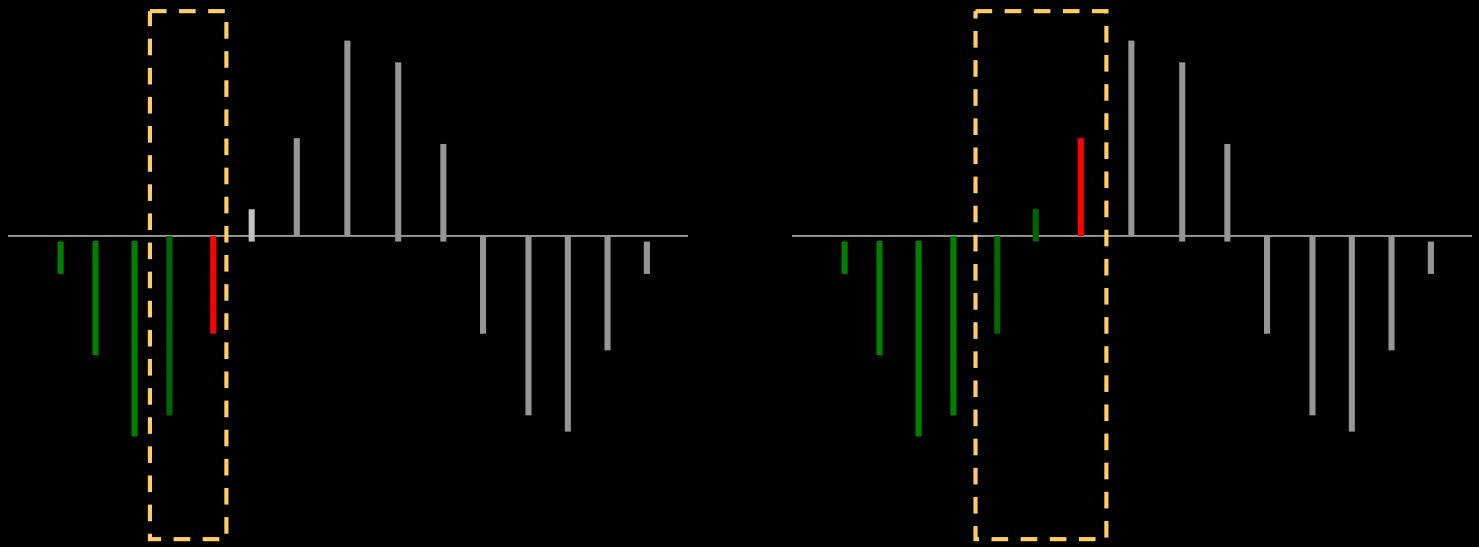
Algorithms



Introduction

Outline

- Terminology
- Classification
- Trigonometric Algorithms
- Correlation Algorithms
- Recursive Algorithms
- Modelling Algorithms

Introduction

Requirements

- Make precise measurements quickly
- Generally system frequency components are the required information
  - Everything else interferes
  - Exceptions – Harmonic-restraint relays, etc
- Signals are corrupted by dc offsets, decaying dc components, ccvt transients, travelling-wave reflections, and other interferences

Terminology

Samples

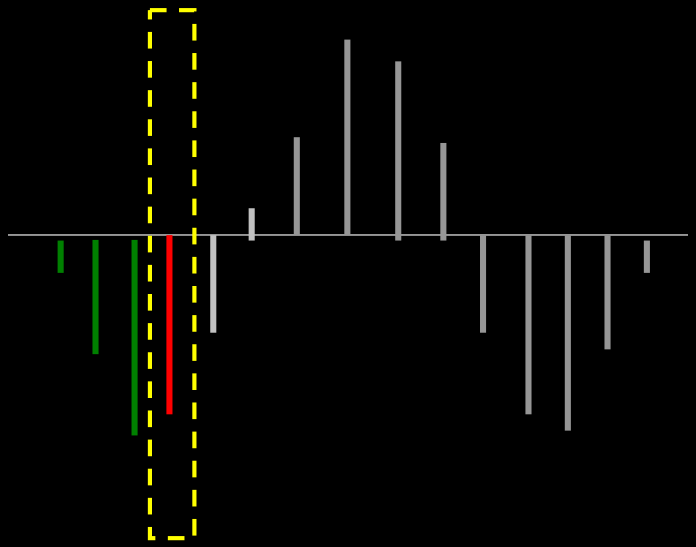
- The numerical representation of the analog input at any instant
- They come one at a time

Window

- A window is a collection of samples
- As new data come in, the oldest data (sample) in the window is discarded

Window - Example

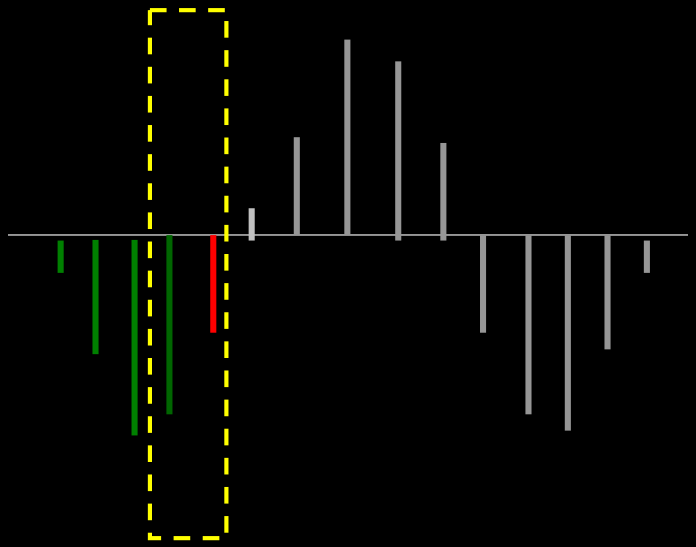
Consider a 3-sample Algorithm



- The first sample comes in

Window - Example

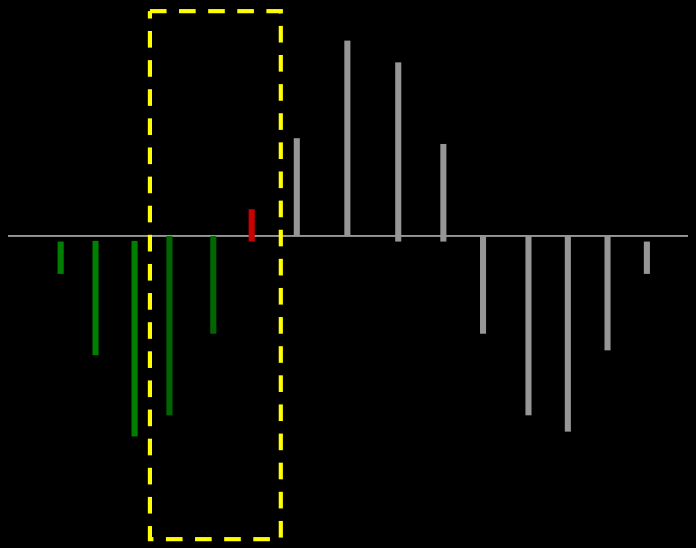
Consider a 3-sample Algorithm



- After one sampling interval the second sample comes in

Window - Example

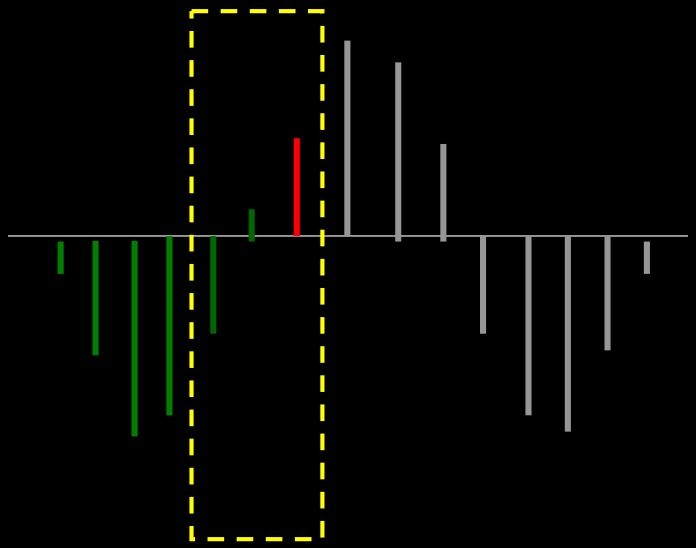
Consider a 3-sample Algorithm



- Another sample comes - the window is full now

Window - Example

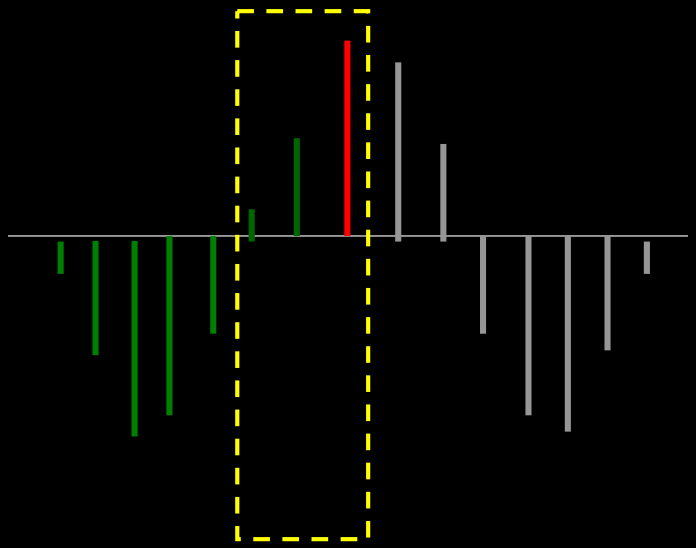
Consider a 3-sample Algorithm



- The oldest sample in the window gets discarded as the new sample comes in

Window - Example

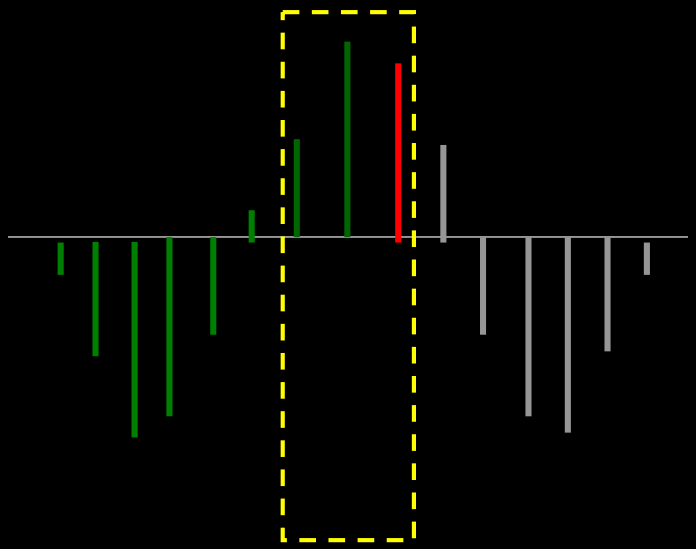
Consider a 3-sample Algorithm



- The process continues ...

Window - Example

Consider a 3-sample Algorithm



- The process continues ...

Classification

- **Non-recursive Algorithms**
  - Trigonometric algorithms
  - Correlation algorithms
  - Least error algorithms