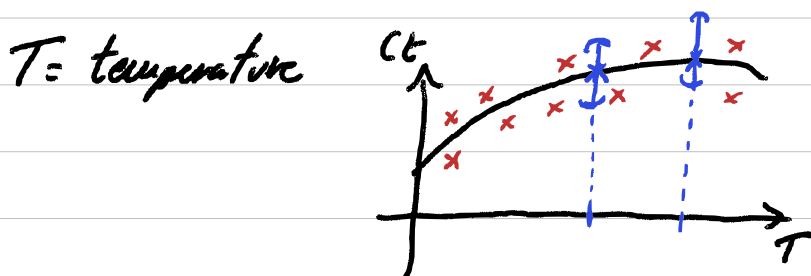# Why are time series special?

Let's imagine that we are an ice cream sales man and we want to predict how many cons of ice cream we are going to sell one given day.

$C_t \equiv$ Cons sold one given day.

There are 2 ways of making that prediction.

1. Non time series way

$T =$ temperature

The ticus in blue represents our prediction of how many cons we are going to sell tomorrow.

In this case, the errors are going to be quite close between each other because we are using **Interpolation**.

Basicly we use interpolation inside a range of values, no outside that range. When we use interpolation, we usually have a lot of points inside that range so the prediction is so accurate.

2. Time series way

We are an ice cream vendor and we want to predict how many cous we are going to sell one random given day as a function of how many cous I sold yesterday.

We are predicting C_t based on C_{t-1}

This is **extrapolation** because we are predicting something [outside] the range of the data we currently have.

Time series will be almost always an extrapolation problem because we will be interested on predicting something on the future. If we use interpolation here we would be predicting something on the past, and for time series it is not interesting.

Today will never happen again.
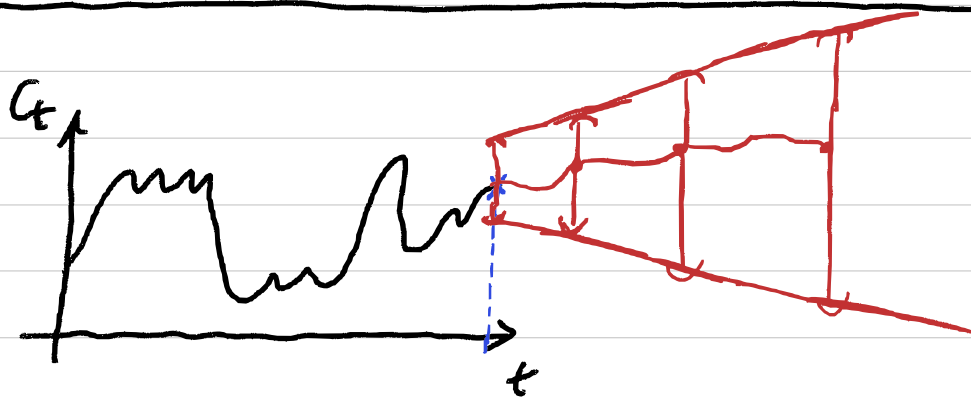
If I try to predict something the next day, Is my error going to be bigger or smaller than the error before?

It's gonna be bigger, because I am going further from my known data.