The Taylor Series is one of a family of approaches used to build approximation functions.

Why Approximate

There are certain cases when it is useful to use approximations.

An example demonstrating the value in approximation is "how long does it take to cook a chicken?".

This example tries to relate a chicken's mass and it's cooking time.

Such an example's function has many assumptions/constraints:

- certain oven type
- certain chicken configuration type (chopped, minced pieces)
- heat transfer properties
  ↳ a non-linear function by mass.

Chicken cooking time

$$t(m, T, OvenFactor, ChickenShapeFactor)$$
$$= 7.83m^5 - 72.3m^4 + 253m^3 - 368m^2 + 250m + 0.02$$
$$+ OvenFactor$$
$$+ ChickenShapeFactor$$

* Formula is sensitive to many parameters.
  ↳ Can simplify by making assumptions
  ↳ Can approximate certain region/points in the graph

With Taylor Series can focus on a single point, that is accurrate around that point of interest. The accurracy deteriorates likely the farther from that point.

With that point the Taylor Series can be used to create a simpler functional model:

$$t^*(m) \approx 50.0m + 15.$$

Approximation is done for

- convenience
- computation/speed
- valid assumptions /constraints