

# Neural Network Implementation Quiz: Blackbody Radiation Prediction

## Problem Statement

Implement a neural network to predict radiated power  $P$  (W) using the Stefan-Boltzmann law:

$$P = \sigma AT^4$$

where:

- $\sigma = 5.67 \times 10^{-8} \text{ W/m}^2\text{K}^4$
- $T \in [100][1000] \text{ K}$  (temperature)
- $A \in [0.1, 10] \text{ m}^2$  (surface area)

## Dataset

File: blackbody\_data.csv

Columns:

1. Temperature ( $K$ )
2. Area ( $\text{m}^2$ )
3. Radiated\_Power ( $W$ ) (precomputed using  $P=\sigma AT^4$ )

## Tasks

### 1. Data Preprocessing

- Load the dataset and split into 80% training and 20% testing sets.
- Normalize/standardize input features ( $T$ ,  $A$ ) and target ( $P$ ) if needed.

### 2. Model Architecture

- Design a neural network with:
  - At least 2 hidden layers.
  - Appropriate activation functions (e.g., ReLU, linear, sigmoid).
  - Output layer for regression.