Python project – component development (AC -DC rectifier)

- **Requirement:**
  - develop an AC – DC rectifier component in python
- **Conceptual design:**
  - Confirm math formula -> implement the component on Python -> simulation test
- **Detailed design:**
  - Math formula for AC-DC rectifier (3-phases):

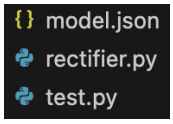
$$V_{ac\_A}(t) = V_m \sin(\omega t)$$

$$V_{ac\_B}(t) = V_m \sin(\omega t - 2\pi/3)$$

$$V_{ac\_C}(t) = V_m \sin(\omega t + 2\pi/3)$$

$$V_{dc}(t) = \max\left(V_m \sin(\omega t), V_m \sin\left(\omega t - \frac{2\pi}{3}\right), V_m \sin\left(\omega t + \frac{2\pi}{3}\right)\right) - \min\left(V_m \sin(\omega t), V_m \sin\left(\omega t - \frac{2\pi}{3}\right), V_m \sin\left(\omega t + \frac{2\pi}{3}\right)\right)$$

  - Python implementation, test and packaging:
    - Folder structure: ACDCrectifier/model.json; rectifier.py; test.py
      - 'model.json': instruction and description sheet for the AC-DC rectifier component
      - 'rectifier,.py': rectifier implementation based on mathematic formula
      - 'test.py': rectifier component test



    - The exact python files are recorded under Git repositories: https://github.com/Diwang0705/PowerSystemAnalysis/tree/6fec5f15ea78f32d74030d50ce77f4b8f85d5c94/ACDCRectifier
    - The test operation from 'test.py' provides a three-phase AC – DC converting, the simulation test result is shown in below figure: