

# TARA3 - Solar Charge Controller with MPPT

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## **Aim of the project:**

To increase system efficiency and reduce system cost by designing a controller (MPPT) that tracks the maximum power point (MPP) of the solar panel and ensures that the solar panel always operates at the MPP. To investigate if the efficiency gain the MPPT yields is worth the additional power drawn and cost of the MPPT.

## **Major Stages involved in the Project:**

1. Researching on different MPPT algorithms to see which corresponds to our given problem statement
2. Once an MPPT algorithm has been selected, we will design a control flow diagram for the implementation of the algorithm
3. Work on the hardware and software aspects of each sub-block of the control flow diagram keeping in mind the cost and availability of components
4. Testing our implementation
  - a. In a simulation environment
  - b. Outdoor with a real solar panel
5. Documenting results and verifying if the performance with the MPPT approaches ideal performance
6. Comparing the fixed and variable voltage MPPT methods
7. Calculating the power drawn by the MPPT and the total additional cost required, and deciding if the efficiency gain obtained is worth it
8. Finding a product in the market closest to our design and comparing if our prototype can compete with this product

## **Major Software/Components Required:**

1. Integrated 7-bit ADC for system monitoring
2. Switched mode buck charger (DC-DC converter design)
3. Some resistance compensation
4. Microcontroller
5. MOSFET driver

## **Reference:**

<https://www.youtube.com/watch?v=U9phLv8q9S8>