Introduction
Portable electronic devices such as cellular phones and laptops have brought convenience to our daily life. Lithium-ion batteries are usually installed inside these devices due to their high energy density and long cycle life. However, a proper charging profile is required or otherwise, their capacities and lifespans may be shortened.
In this project, a simple pseudo two-stage Lithium-ion battery charger circuit is designed to optimize the charging profile.

Objective
- To design a charging profile which consists of a constant current stage and a constant voltage stage.
- To ensure the charging process can switch from the first stage to the second stage automatically.

Methodology
Lithium ion batteries cannot be charged by using only constant voltage supply due to the large charging current which can damage the battery.

Constant current stage:
The battery is charged with a constant voltage charging with a current limiting of 0.5A until its voltage reaches 4.2V.

Constant voltage stage:
The battery continues to be charged at a constant voltage of 4.2V.

Results
Simulation result above shows a pseudo two-stage charging profile with constant current followed by constant voltage is achieved. This pseudo two-stage charging profile is the optimum method under existing technologies since battery can be charged effectively and stably without shortening its capacity and lifespan.

Conclusion
It is expected that Lithium ion battery will dominate the battery market in coming years. This simple pseudo two-stage charging method can definitely contribute to the development of the battery charger industry and lead it to a new era.