Problem 2 (due on Monday, September 23)

Let $f:\mathbb R\longrightarrow \mathbb R$ be a function such for any x,y either $f(x-y)+f(y)=f(x)$ or $f(y-x)+f(x)=f(y)$. Prove that the sum $f(x)+f(-x)$ assumes at most two different values. Find an example when $f(x)+f(-x)$ assumes two different values.

We received two solutions (one partial and one complete), from Levi Axelrod and Surajit Rajagopal. Levi's solution is similar to our solution and the example he provided is simpler than the one in our original solution. For a detailed solution see the following link Solution.