

Why weak induction can fail

Let $F : \mathbb{Z}^+ \rightarrow \mathbb{Z}$ be defined by

- ▶ $F(1) = 1$ and $F(2) = 0$
- ▶ $F(n) = F(n - 2)$ if $n > 2$

Suppose $P(n)$ is the statement $F(n) = n \pmod{2}$.

To show that $P(n) \rightarrow P(n + 1)$ we need to show that

- ▶ If $F(n) = n \pmod{2}$ then $F(n + 1) = n + 1 \pmod{2}$.

Let's try this.