K-Induction

- Extends bounded model checking to be able to prove properties
- Based on the concept of (strong) mathematical induction
- For increasing values of k, check:
  - Base Case: $I(s_0) \wedge \bigwedge_{i=1}^{k} T(s_{i-1}, s_i) \wedge \neg P(s_k)$
  - Inductive Case: $\left(\bigwedge_{i=1}^{k} T(s_{i-1}, s_i) \wedge P(s_{i-1})\right) \wedge \neg P(s_k)$
  - If base case is SAT, return a counter-example
  - If inductive case is UNSAT, return TRUE
  - Otherwise, continue

Mary Sheeran, Satnam Singh, and Gunnar Stälmarck. Checking safety properties using induction and a SAT-solver. FMCAD 2000