

## What is Strong Fairness?

Naming a property *weak fairness* suggests that there is also a property named *strong fairness*. Strong fairness of an action  $A$  is the property that asserts that a behavior is *strongly fair* for  $A$ . The definition of a behavior  $\sigma$  being strongly fair for  $A$  differs from the definition of weakly fair in that its second condition is strengthened to:

- $\sigma$  does not contain an infinite suffix  $\tau$  such that  $A$  is enabled in infinitely many states of  $\tau$  and  $\tau$  contains no  $A$  steps.

This is a stronger condition than for weakly fair because, if  $A$  is enabled in every state of the infinite suffix  $\tau$ , then it is enabled in infinitely many states of  $\tau$ .

Weak fairness is a more common requirement than strong fairness—though for many specifications, the two conditions are equivalent. For example, weak and strong fairness are equivalent for the *Rcv* process of the bounded channel because once the system reaches a state in which *Rcv* is enabled, if no further *Rcv* steps occur then *Rcv* remains enabled from then on (because the channel stays nonempty).