

Restricting specs to fair paths.

need to check Ψ_{spec}

$M, s_0 \stackrel{?}{\models} \Psi_{\text{spec}}$

Suppose, we are interested
in fair paths only,
i.e., those where p happens
inf. often

$\Rightarrow$ want to limit our
checking procedure to
paths where inf. often p .

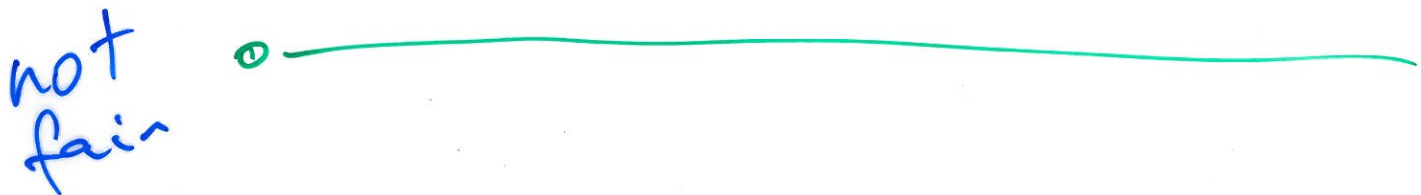
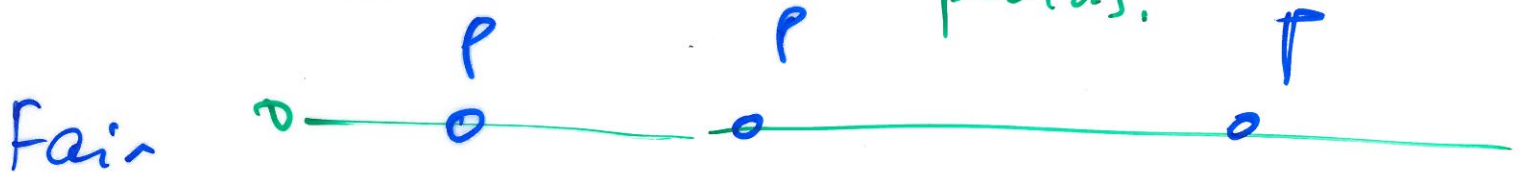
Try in CTL:

Instead of $M, s_0 \models \psi_{\text{spec}}$

check $M, s_0 \models \text{AG AF } p \rightarrow \psi_{\text{spec}}$

Suppose

Our system has both fair & non-fair paths.



For systems with both fair and non-fair paths:

$AG AF_p$ is always false,

So $AG AF_p \rightarrow \psi_{spec}$

i) always true,

regardless of ψ_{spec} being
True or False

Try in LTL:

Instead of $M, s_0 \models \psi_{spec}$

Check $M, s_0 \models \underbrace{GFp \rightarrow \psi_{spec}}_{\varphi}$

Our system:

Fair $\pi_1:$ 

not fair $\pi_2:$ 

Fair 

not Fair 

In LTL, to check $s_0 \models \varphi$,
need to check φ in every
path going out of s_0 first.

1) Ψ_{spec} is true in M, s_0 .

π_1 : GF_p is true, Ψ_{spec}
is true

$\Rightarrow$ output is true. $\checkmark$

π_2 : GF_p is false

$\Rightarrow$ output is true $\checkmark$

...

so, $M, s_0 \models GF_p \rightarrow \Psi_{\text{spec}}$
 $\nearrow$
yes.

2) ψ_{spec} is false in M, s_0 :

π_1 : GF_p is true, ψ_{spec} is false

$\Rightarrow$ $GF_p \rightarrow \psi_{\text{spec}}$ is false.

π_2 : GF_p is false, ψ_{spec} is false

$\Rightarrow$ $GF_p \rightarrow \psi_{\text{spec}}$ is true.

$\Rightarrow \psi$ is false in M, s_0 .

$M, s_0 \not\models GF_p \rightarrow \psi_{\text{spec}}$

the answer will be no, which is correct.