ON THE RELATIONSHIP BETWEEN COINDUCTIVELY DEFINED R AND INDUCTIVELY DEFINED $\not R$

Jules Jacobs

October 21, 2021

In this note we show that if a set R has been coinductively defined, then the complement $\not R$ can be defined inductively and vice versa. That is, from coinductive rules for R we can mechanically derive inductive rules for $\not R$ and vice versa. In the case when R is coinductively defined bisimulation, we get the inductive rules for apartness.

1 INTRODUCTION

$$\begin{aligned} R \text{ inductively defined } &\iff R \triangleq \mathsf{lfp}(F) \\ R \text{ coinductively defined } &\iff R \triangleq \mathsf{gfp}(G) \end{aligned}$$

[ORT09]

REFERENCES

[ORT09] Scott Owens, John Reppy, and Aaron Turon. Regular-expression derivatives re-examined. *Journal of Functional Programming*, 19(2):173–190, 2009. doi:10.1017/S0956796808007090.