Comonadic Matter Meets Monadic Anti-Matter: An Adjoint Model of Bi-Intuitionistic Logic

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Abstract

1998 ACM Subject Classification Dummy classification – please refer to http://www.acm.org/about/class/ccs98-html

Keywords and phrases Dummy keyword – please provide 1–5 keywords

Digital Object Identifier 10.4230/LIPIcs...

1 Introduction

TODO [**?**]

References

$$\frac{G,(w,w);\Theta \vdash_{\mathsf{I}} w : Y}{G;\Theta \vdash_{\mathsf{I}} w : Y}\ \mathrm{I\_RL} \qquad \frac{\begin{array}{c} w_1 G w_2 \qquad w_2 G w_3 \\ G,(w_1,w_3);\Theta \vdash_{\mathsf{I}} w : Y \end{array}}{G;\Theta \vdash_{\mathsf{I}} w : Y}\ \mathrm{I\_TS}$$

$$\frac{}{G; w : Y \vdash_{\mathsf{I}} w : Y}\ \mathrm{I\_ID} \qquad \frac{G;\Theta \vdash_{\mathsf{I}} w : Y}{G;\Theta, w : X \vdash_{\mathsf{I}} w : Y}\ \mathrm{I\_WK}$$

$$\frac{G;\Theta, w : X, w : X \vdash_{\mathsf{I}} w : Y}{G;\Theta, w : X \vdash_{\mathsf{I}} w : Y}\ \mathrm{I\_CR} \qquad \frac{\begin{array}{c} w_1 G w_2 \\ G;\Theta, w_1 : X, w_2 : X \vdash_{\mathsf{I}} w : Y \end{array}}{G;\Theta, w_1 : X \vdash_{\mathsf{I}} w : Y}\ \mathrm{I\_ML}$$

$$\frac{\begin{array}{c} w_2 G w_1 \\ G;\Theta \vdash_{\mathsf{I}} w_2 : Y \end{array}}{G;\Theta \vdash_{\mathsf{I}} w_1 : Y}\ \mathrm{I\_MR} \qquad \frac{G;\Theta \vdash_{\mathsf{I}} w : Y}{G;\Theta, w : \top \vdash_{\mathsf{I}} w : Y}\ \mathrm{I\_TL} \qquad \frac{}{G;\Theta \vdash_{\mathsf{I}} w : \top}\ \mathrm{I\_TR}$$

$$\frac{G;\Theta, w_1 : X, w_1 : Y \vdash_{\mathsf{I}} w_2 : Z}{G;\Theta, w_1 : X \times Y \vdash_{\mathsf{I}} w_2 : Z}\ \mathrm{I\_AL} \qquad \frac{G;\Theta_1 \vdash_{\mathsf{I}} w : X \qquad G;\Theta_2 \vdash_{\mathsf{I}} w : Y}{G;\Theta_1,\Theta_2 \vdash_{\mathsf{I}} w : X \times Y}\ \mathrm{I\_AR}$$

$$\frac{\begin{array}{c} w_1 G w_2 \\ G;\Theta_2 \vdash_{\mathsf{I}} w_2 : X \qquad G;\Theta_1, w_2 : Y \vdash_{\mathsf{I}} w : Z \end{array}}{G;\Theta_1,\Theta_2, w_1 : X \to Y \vdash_{\mathsf{I}} w : Z}\ \mathrm{I\_IL}$$

$$\frac{\begin{array}{c} w_2 \notin |G|, |\Theta| \\ G,(w_1,w_2);\Theta, w_2 : X \vdash_{\mathsf{I}} w_2 : Y \end{array}}{G;\Theta \vdash_{\mathsf{I}} w_1 : X \to Y}\ \mathrm{I\_IR}$$

$$\frac{G;\Theta_2 \vdash_{\mathsf{I}} w : X \qquad G;\Theta_1, w : X \vdash_{\mathsf{I}} w : Z}{G;\Theta_1,\Theta_2 \vdash_{\mathsf{I}} w : Z}\ \mathrm{I\_CUT}$$

Figure 1 Intuitionistic Fragment of L

$$\frac{G, (w, w); w : S \vdash_{\mathsf{C}} \Psi}{G; w : S \vdash_{\mathsf{C}} \Psi}\ \mathrm{C\_RL} \qquad \frac{w_1 G w_2 \quad w_2 G w_3 \quad G, (w_1, w_3); w : S \vdash_{\mathsf{C}} \Psi}{G; w : S \vdash_{\mathsf{C}} \Psi}\ \mathrm{C\_TS}$$

$$\frac{}{G; w : S \vdash_{\mathsf{C}} w : S}\ \mathrm{C\_ID} \qquad \frac{G; w : S \vdash_{\mathsf{C}} \Psi}{G; w : S \vdash_{\mathsf{C}} w : T, \Psi}\ \mathrm{C\_WK}$$

$$\frac{G; w : S \vdash_{\mathsf{C}} w : T, w : T, \Psi}{G; w : S \vdash_{\mathsf{C}} w : T, \Psi}\ \mathrm{C\_CR} \qquad \frac{w_1 G w_2 \quad G; w_2 : S \vdash_{\mathsf{C}} \Psi}{G; w_1 : S \vdash_{\mathsf{C}} \Psi}\ \mathrm{C\_ML}$$

$$\frac{w_2 G w_1 \quad G; w : S \vdash_{\mathsf{C}} w_2 : T, w_1 : T, \Psi}{G; w : S \vdash_{\mathsf{C}} w_1 : T, \Psi}\ \mathrm{C\_MR} \qquad \frac{}{G; w : \bot \vdash_{\mathsf{C}} \Psi}\ \mathrm{C\_FL}$$

$$\frac{G; w : S \vdash_{\mathsf{C}} \Psi}{G; w : S \vdash_{\mathsf{C}} w : \bot, \Psi}\ \mathrm{C\_FR} \qquad \frac{G; w : S \vdash_{\mathsf{C}} \Psi_1 \quad G; w : T \vdash_{\mathsf{C}} \Psi_2}{G; w : S + T \vdash_{\mathsf{C}} \Psi_1, \Psi_2}\ \mathrm{C\_DL}$$

$$\frac{G; w : R \vdash_{\mathsf{C}} w : S, w : T, \Psi}{G; w : R \vdash_{\mathsf{C}} w : S + T, \Psi}\ \mathrm{C\_DR} \qquad \frac{w_2 \notin |G|, |\Psi| \quad G, (w_2, w_1); w_2 : S \vdash_{\mathsf{C}} w_2 : T, \Psi}{G; w_1 : S - T \vdash_{\mathsf{C}} \Psi}\ \mathrm{C\_SL}$$

$$\frac{w_2 G w_1 \quad G; w : R \vdash_{\mathsf{C}} w_2 : S, \Psi_2 \quad G; w_2 : T \vdash_{\mathsf{C}} \Psi_1}{G; w : R \vdash_{\mathsf{C}} w_1 : S - T, \Psi_1, \Psi_2}\ \mathrm{C\_SR}$$

$$\frac{G; w : S \vdash_{\mathsf{C}} w : T, \Psi_2 \quad G; w : T \vdash_{\mathsf{C}} \Psi_1}{G; w : S \vdash_{\mathsf{C}} \Psi_1, \Psi_2}\ \mathrm{C\_CUT}$$

Figure 2 Co-intuitionistic Fragment of L

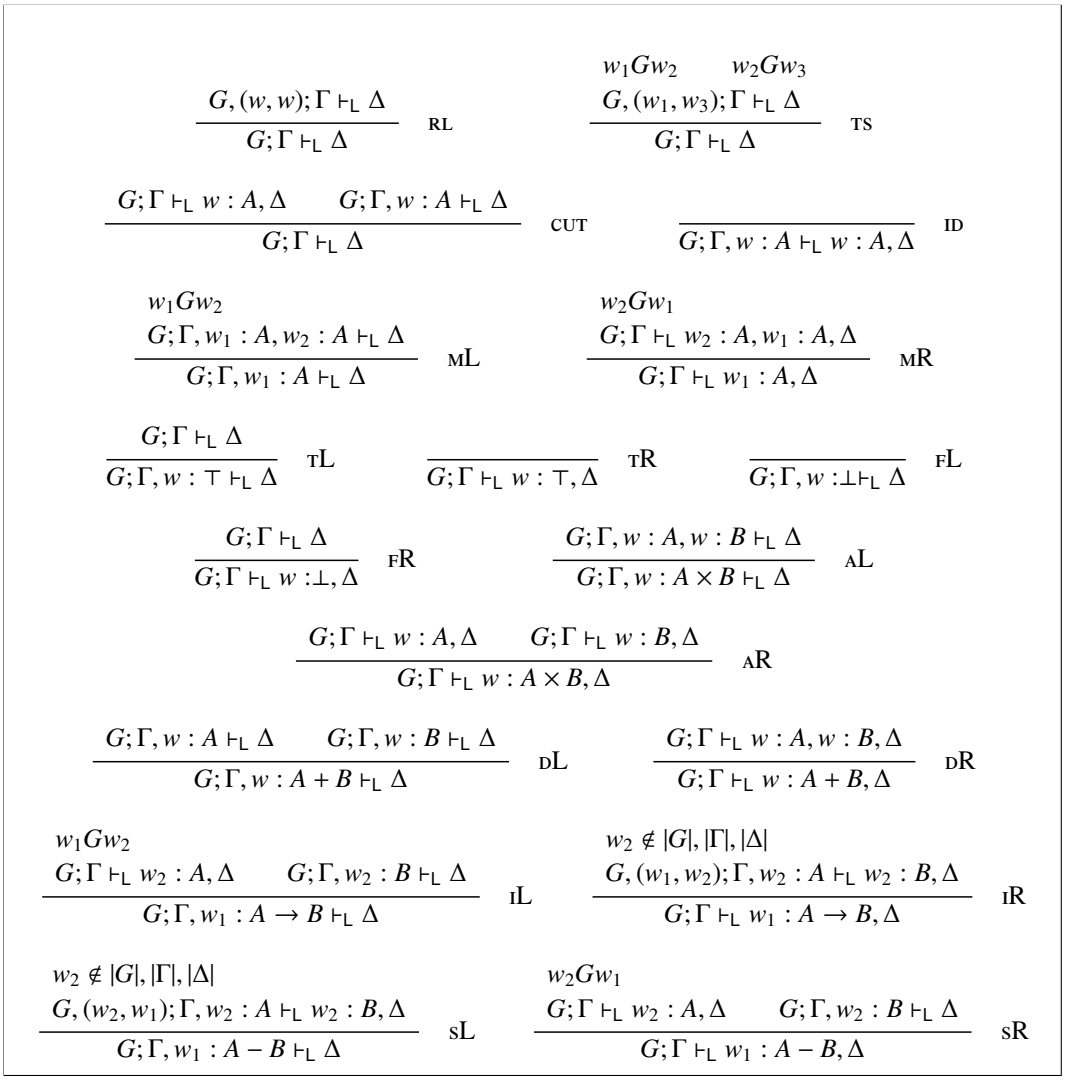

Figure 3 Inference Rules for L