Logic and Language: Exercise (Week 6)

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1 Syntax

1.1

First, we define the rules of rightward extraction $\widehat{\alpha}_{\diamond}^r$, $\widehat{\sigma}_{\diamond}^r$:

$$\frac{f:A\otimes (B\otimes \Diamond C)\to D}{\widehat{\alpha}_{\diamond}^r f:(A\otimes B)\otimes \Diamond C\to D} \qquad \qquad \frac{f:(A\otimes \Diamond C)\otimes B\to D}{\widehat{\sigma}_{\diamond}^r f:(A\otimes B)\otimes \Diamond C\to D}$$

We can now proceed with the derivation of

$$n \otimes ((n \setminus n)/(s/\Diamond \Box np)) \otimes ((np/n) \otimes n) \otimes ((np \setminus s)/np)) \to n$$

as follows:

$$\frac{\overline{np \vdash np} \ ^{1}np \ \overline{n \vdash n} \ ^{1}n}{\underline{np \backslash s \vdash np \backslash s} \ ^{1}n} \ ^{1}n} \frac{\overline{np \vdash np} \ ^{1}np}{\underline{np \vdash np}} \ ^{1}np}{\underline{np \vdash np} \ ^{1}np} \ ^{1}np} \xrightarrow{\overline{np \vdash np}} \ ^{1}np} \xrightarrow{\overline{np \backslash s \vdash ((np \backslash n) \otimes n) \backslash s}} \ ^{1}np \backslash np \vdash ((np \backslash n) \otimes n) \backslash s) / \Diamond \square np} \ ^{1}np \backslash np \backslash s) / np} \xrightarrow{\overline{np \backslash s \vdash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \vdash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \vdash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \vdash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \vdash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np \backslash np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np} \xrightarrow{\overline{np \backslash np}} \ ^{1}np} \xrightarrow{\overline{np \backslash np \backslash np}} \ ^{1}np} \xrightarrow{\overline{np \backslash np}} \ ^{1}np} \ ^{1}np} \xrightarrow{\overline{np \backslash np}} \ ^{1}np} \xrightarrow{\overline{$$