Continuations, mobile processes, all the things...

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Memo/garbage part

$M, N ::= x; \lambda x.M; MN$
$(\lambda x.M)N \to_\beta M[N/x]$ terms tend to get bigger

If $C[\,]$ is a context, and $M \to_\beta N$
then $C[M] \to_\beta C[N]$

$P, Q ::= u(xy).P; \bar{u}xy.P; P|Q; (\nu x)P|!P$
$u(xy).P|\bar{u}ab.Q \to P[a/x, b/y]|Q$

If $P \to Q$ then $C[P] \to C[Q]$ (with necessary hypothesis on context C)
If $P \equiv P' \to Q \equiv Q'$ then $P \to Q$

Krivine Abstract Machine (KAM)
$M \star \Pi \star \mathcal{E}$

$$\begin{aligned}
MN \star \Pi \star \mathcal{E} &\to M \star (N, \mathcal{E}).\Pi \star \mathcal{E} \\
\lambda x.M \star (N, \mathcal{E}).\Pi \star \mathcal{F} &\to M \star \Pi \star \mathcal{F}, s \mapsto (N, \mathcal{E}) \\
x \star \Pi \star \mathcal{E}, x \mapsto (M, \mathcal{F}) &\to M \star \Pi \star \mathcal{F}
\end{aligned}$$

For exponentials :
$!P \simeq !P|!P$
$(\nu u)!u(x).P \simeq 0$
idea : $!P|Q \simeq !P|!P|Q \;\; \forall Q$

$$\begin{aligned}
[\![(M, \mathcal{E}).\Pi]\!]_u &= (\nu m)(\nu v)(\bar{u}mv|!m(x)[\![M, \mathcal{E}]\!]_x|[\![\Pi]\!]_v) \\
[\![M, (x_i \mapsto (M_i, \mathcal{E}_i))_{i=1..k}]\!]_u &= (\nu x_1) \cdots (\nu x_k)([\![M]\!]_u|!x_1(u).[\![M_1, \mathcal{E}_1]\!]_u| \cdots) \\
[\![MN]\!]_u &= (\nu v)(\nu n)([\![M]\!]_v|\bar{v}nu|!n(x).[\![N]\!]_x) \\
[\![\lambda x.M]\!]_u &= u(xv).[\![M]\!]_v \\
[\![x]\!]_u &= \bar{x}u
\end{aligned}$$

We want $M \star \Pi \star \mathcal{E} \to M' \star \Pi' \star \mathcal{E}'$ iff $[\![M, \mathcal{E}]\!]_u|[\![\Pi]\!]_u \to [\![M', \mathcal{E}']\!]_v|[\![\Pi']\!]_v$

- equiv $\simeq$ bisimulation
- the traduction goes well