1   Grammar

$$e ::= \qquad\qquad\qquad\qquad \textbf{exprs.}$$
$$\mid \quad x \qquad\qquad\qquad variable$$
$$\mid \quad v \qquad\qquad\qquad\quad value$$
$$\mid \quad e.\pi \qquad\qquad operation\ call$$
$$\mid \quad e\ e \qquad\qquad\quad application$$
$$\mid \quad e\ \tau \qquad\qquad type\ application$$

$$v ::= \qquad\qquad\qquad\qquad \textbf{values}$$
$$\mid \quad r \qquad\qquad\qquad resource\ literal$$
$$\mid \quad \lambda x : \tau.e \qquad\qquad\quad abstraction$$
$$\mid \quad \lambda X <: \tau.e \qquad type\ polymorphism$$

$$\hat{e} ::= \qquad\qquad\qquad\qquad \textbf{annotated exprs.}$$
$$\mid \quad x \qquad\qquad\qquad\qquad variable$$
$$\mid \quad \hat{v} \qquad\qquad\qquad\qquad\quad value$$
$$\mid \quad \hat{e}.\pi \qquad\qquad\qquad operation\ call$$
$$\mid \quad \hat{e}\ \hat{e} \qquad\qquad\qquad\quad application$$
$$\mid \quad e\ \hat{\tau} \qquad\qquad\qquad type\ application$$
$$\mid \quad e\ \varepsilon \qquad\qquad\qquad effect\ application$$
$$\mid \quad \texttt{import}(\varepsilon_s)\ x = \hat{e}\ \texttt{in}\ e \qquad import$$

$$\hat{v} ::= \qquad\qquad\qquad\qquad \textbf{annotated values}$$
$$\mid \quad r \qquad\qquad\qquad\qquad resource\ literal$$
$$\mid \quad \lambda x : \hat{\tau}.\hat{e} \qquad\qquad\qquad abstraction$$
$$\mid \quad \lambda X <: \hat{\tau}.\hat{e} \qquad type\ polymorphism$$
$$\mid \quad \lambda \phi \subseteq \varepsilon.\hat{e} \qquad effect\ polymorphism$$

$$\tau ::= \qquad\qquad\qquad\qquad \textbf{types}$$
$$\mid \quad X \qquad\qquad\qquad type\ variable$$
$$\mid \quad \{\bar{r}\} \qquad\qquad\qquad effect\ set$$
$$\mid \quad \tau \to \tau \qquad\qquad\qquad arrow$$
$$\mid \quad \forall X <: \tau.\tau \qquad universal\ type$$

$$\hat{\tau} ::= \qquad\qquad\qquad\qquad \textbf{annotated types}$$
$$\mid \quad X \qquad\qquad\qquad\qquad type\ variable$$
$$\mid \quad \{\bar{r}\} \qquad\qquad\qquad\qquad resource\ set$$
$$\mid \quad \hat{\tau} \to_\varepsilon \hat{\tau} \qquad\qquad annotated\ arrow$$
$$\mid \quad \forall X <: \hat{\tau}.\hat{\tau}\ \texttt{caps}\ \varepsilon \qquad universal\ type$$
$$\mid \quad \forall \phi \subseteq \varepsilon.\hat{\tau}\ \texttt{caps}\ \varepsilon \quad universal\ effect\ set$$

$$\varepsilon ::= \qquad\qquad\qquad\qquad \textbf{effects}$$
$$\mid \quad \phi \qquad\qquad\qquad effect\ variable$$
$$\mid \quad \{\overline{r.\pi}\} \qquad\qquad\qquad\quad effect\ set$$

$$\Gamma ::= \qquad\qquad\qquad\qquad \textbf{contexts}$$
$$\mid \quad \varnothing \qquad\qquad\qquad\qquad empty\ ctx.$$
$$\mid \quad \Gamma, x : \tau \qquad\qquad\qquad var.\ binding$$
$$\mid \quad \Gamma, X <: \tau \qquad type\ var.\ binding$$

$$\hat{\Gamma} ::= \qquad\qquad\qquad\qquad \textbf{annotated contexts}$$
$$\mid \quad \varnothing \qquad\qquad\qquad\qquad empty\ ctx.$$
$$\mid \quad \hat{\Gamma}, x : \hat{\tau} \qquad\qquad\qquad var.\ binding$$
$$\mid \quad \hat{\Gamma}, X <: \hat{\tau} \qquad type\ var.\ binding$$
$$\mid \quad \hat{\Gamma}, \phi \subseteq \varepsilon \qquad effect\ var.\ binding$$

2   Functions

Definition (annot :: $\tau \times \varepsilon \to \hat{\tau}$)

1. $\texttt{annot}(X, \_) = X$
2. $\texttt{annot}(\{\bar{r}\}, \_) = \{\bar{r}\}$
3. $\texttt{annot}(\tau_1 \to \tau_2, \varepsilon) = \texttt{annot}(\tau_1, \varepsilon) \to_\varepsilon \texttt{annot}(\tau_2, \varepsilon)$
4. $\texttt{annot}(\forall X <: \tau_1.\tau_2, \varepsilon) = \forall X <: \texttt{annot}(\tau_1, \varepsilon).\texttt{annot}(\tau_2, \varepsilon)\ \texttt{caps}\ \varepsilon$

Definition (annot :: e $\times\ \varepsilon \to \hat{e}$)

1. $\texttt{annot}(x, \_) = e$
2. $\texttt{annot}(r, \_) = r$
3. $\texttt{annot}(\lambda x : \tau.e, \varepsilon) = \lambda x : \texttt{annot}(\tau, \varepsilon).\texttt{annot}(e, \varepsilon)$
4. $\texttt{annot}(e_1\ e_2, \varepsilon) = \texttt{annot}(e_1)\ \texttt{annot}(e_2)$
5. $\texttt{annot}(e.\pi, \varepsilon) = \texttt{annot}(e, \varepsilon).\pi$
6. $\texttt{annot}(\lambda X <: \tau_1.e, \varepsilon) = \lambda X <: \texttt{annot}(\tau_1, \varepsilon).\texttt{annot}(e, \varepsilon)$
7. $\texttt{annot}(e\ \tau, \varepsilon) = \texttt{annot}(e, \varepsilon)\ \texttt{annot}(\tau, \varepsilon)$

Definition (annot :: $\Gamma \times \varepsilon \to \hat{\Gamma}$)

1. $\texttt{annot}(\varnothing, \_) = \varnothing$
2. $\texttt{annot}((\Gamma, x : \tau), \varepsilon) = \texttt{annot}(\Gamma, \varepsilon), x : \texttt{annot}(\tau, \varepsilon)$
3. $\texttt{annot}((\Gamma, X <: \tau), \varepsilon) = \texttt{annot}(\Gamma, \varepsilon), X <: \texttt{annot}(\tau, \varepsilon)$

Definition (erase :: $\hat{\tau} \to \tau$)

1. $\mathtt{erase}(X) = X$
2. $\mathtt{erase}(\{\bar{r}\}) = \{\bar{r}\}$
3. $\mathtt{erase}(\hat{\tau}_1 \to_\varepsilon \hat{\tau}_2) = \mathtt{erase}(\hat{\tau}_1) \to \mathtt{erase}(\hat{\tau}_2)$
4. $\mathtt{erase}(\forall X <: \hat{\tau}_1.\hat{\tau}_2 \ \mathtt{caps} \ \varepsilon) = \forall X <: \mathtt{erase}(\hat{\tau}_1).\mathtt{erase}(\hat{\tau}_2)$

Definition (erase :: $\hat{e} \to e$)

1. $\mathtt{erase}(x) = x$
2. $\mathtt{erase}(r) = r$
3. $\mathtt{erase}(\lambda x : \hat{\tau}.\hat{e}) = \lambda x : \mathtt{erase}(\hat{\tau}).\mathtt{erase}(\hat{e})$
4. $\mathtt{erase}(\hat{e}_1 \ \hat{e}_2) = \mathtt{erase}(\hat{e}_1)\mathtt{erase}(\hat{e}_2)$
5. $\mathtt{erase}(\hat{e}.\pi) = \mathtt{erase}(\hat{e}).\pi$
6. $\mathtt{erase}(\lambda X <: \hat{\tau}.\hat{e}) = \lambda X <: \mathtt{erase}(\hat{\tau}).\mathtt{erase}(\hat{e})$

Definition (erase :: $\hat{\Gamma} \to \Gamma$)

1. $\mathtt{erase}(\varnothing) = \varnothing$
2. $\mathtt{erase}(\hat{\Gamma}, x : \hat{\tau}) = \mathtt{erase}(\hat{\Gamma}), x : \mathtt{erase}(\hat{\tau})$
3. $\mathtt{erase}(\hat{\Gamma}, X <: \hat{\tau}) = \mathtt{erase}(\hat{\Gamma}), X <: \mathtt{erase}(\hat{\tau})$

Definition (effects :: $\hat{\tau} \to \varepsilon$)

1. $\mathtt{effects}(X) = \varnothing$
2. $\mathtt{effects}(\{\bar{r}\}) = \{r.\pi \mid r \in \bar{r}, \pi \in \Pi\}$
3. $\mathtt{effects}(\hat{\tau}_1 \to_\varepsilon \hat{\tau}_2) = \mathtt{ho\text{-}effects}(\hat{\tau}_1) \cup \varepsilon \cup \mathtt{effects}(\hat{\tau}_2)$
4. $\mathtt{effects}(\forall X <: \hat{\tau}_1.\hat{\tau}_2 \ \mathtt{caps} \ \varepsilon_1) = \mathtt{ho\text{-}effects}(\hat{\tau}_1) \cup \mathtt{effects}([\hat{\tau}_1/X]\hat{\tau}_2) \cup \varepsilon_1$
5. $\mathtt{effects}(\forall \phi \subseteq \varepsilon.\hat{\tau} \ \mathtt{caps} \ \varepsilon_1) = \mathtt{effects}([\varepsilon/\phi]\hat{\tau}) \cup \varepsilon_1$

Definition (ho-effects :: $\hat{\tau} \to \varepsilon$)

1. $\mathtt{ho\text{-}effects}(X) = \varnothing$
2. $\mathtt{ho\text{-}effects}(\{\bar{r}\}) = \varnothing$
3. $\mathtt{ho\text{-}effects}(\hat{\tau}_1 \to_\varepsilon \hat{\tau}_2) = \mathtt{effects}(\hat{\tau}_1) \cup \mathtt{ho\text{-}effects}(\hat{\tau}_2)$
4. $\mathtt{ho\text{-}effects}(\forall X <: \hat{\tau}_1.\hat{\tau}_2 \ \mathtt{caps} \ \varepsilon) = \mathtt{effects}(\hat{\tau}_1) \cup \mathtt{ho\text{-}effects}([\hat{\tau}_1/X]\hat{\tau}_2)$
5. $\mathtt{ho\text{-}effects}(\forall \phi \subseteq \varepsilon.\hat{\tau} \ \mathtt{caps} \ \varepsilon_1) = \varepsilon \cup \mathtt{ho\text{-}effects}([\varepsilon/\phi]\hat{\tau})$

3 Static Rules

$\boxed{\Gamma \vdash e : \tau}$

$$\frac{}{\Gamma, x : \tau \vdash x : \tau} \ \text{(T-Var)} \quad \frac{}{\Gamma, r : \{r\} \vdash r : \{r\}} \ \text{(T-Resource)} \quad \frac{\Gamma \vdash e : \{\bar{r}\}}{\Gamma \vdash e.\pi : \mathtt{Unit}} \ \text{(T-OperCall)}$$

$$\frac{\Gamma, x : \tau_1 \vdash e : \tau_2}{\Gamma \vdash \lambda x : \tau_1.e : \tau_1 \to \tau_2} \ \text{(T-Abs)} \quad \frac{\Gamma \vdash e_1 : \tau_2 \to \tau_3 \quad \Gamma \vdash e_2 : \tau_2}{\Gamma \vdash e_1 \ e_2 : \tau_3} \ \text{(T-App)}$$

$$\frac{\Gamma, X <: \tau_1 \vdash e : \tau_2}{\Gamma \vdash \lambda X <: \tau_1.e : \forall X <: \tau_1.\tau_2} \ \text{(T-PolyTypeAbs)} \quad \frac{\Gamma \vdash e : \forall X <: \tau_1.\tau_2 \quad \tau' <: \tau_1}{\Gamma \vdash e \ \tau' : [\tau'/X]\tau_2} \ \text{(T-PolyTypeApp)}$$

$\boxed{\hat{\Gamma} \vdash \hat{e} : \hat{\tau} \ \mathtt{with} \ \varepsilon}$

$$\frac{}{\hat{\Gamma}, x : \tau \vdash x : \tau \ \texttt{with} \ \varnothing} \ (\varepsilon\text{-}\textsc{Var}) \quad \frac{}{\hat{\Gamma}, r : \{r\} \vdash r : \{r\} \ \texttt{with} \ \varnothing} \ (\varepsilon\text{-}\textsc{Resource})$$

$$\frac{\hat{\Gamma} \vdash \hat{e} : \{\bar{r}\} \ \texttt{with} \ \varepsilon_1}{\hat{\Gamma} \vdash \hat{e}.\pi : \texttt{Unit} \ \texttt{with} \ \varepsilon_1 \cup \{r.\pi \mid r \in \bar{r}\}} \ (\varepsilon\text{-}\textsc{OperCall}) \quad \frac{\hat{\Gamma} \vdash e : \tau \ \texttt{with} \ \varepsilon \quad \tau <: \tau' \quad \varepsilon \subseteq \varepsilon'}{\hat{\Gamma} \vdash e : \tau' \ \texttt{with} \ \varepsilon'} \ (\varepsilon\text{-}\textsc{Subsume})$$

$$\frac{\hat{\Gamma}, x : \hat{\tau}_2 \vdash \hat{e} : \hat{\tau}_3 \ \texttt{with} \ \varepsilon_3}{\hat{\Gamma} \vdash \lambda x : \tau_2.\hat{e} : \hat{\tau}_2 \rightarrow_{\varepsilon_3} \hat{\tau}_3 \ \texttt{with} \ \varnothing} \ (\varepsilon\text{-}\textsc{Abs}) \quad \frac{\hat{\Gamma} \vdash \hat{e}_1 : \hat{\tau}_2 \rightarrow_{\varepsilon} \hat{\tau}_3 \ \texttt{with} \ \varepsilon_1 \quad \hat{\Gamma} \vdash \hat{e}_2 : \hat{\tau}_2 \ \texttt{with} \ \varepsilon_2}{\hat{\Gamma} \vdash \hat{e}_1 \hat{e}_2 : \hat{\tau}_3 \ \texttt{with} \ \varepsilon_1 \cup \varepsilon_2 \cup \varepsilon} \ (\varepsilon\text{-}\textsc{App})$$

$$\frac{\hat{\Gamma}, X <: \hat{\tau}_1 \vdash \hat{e} : \hat{\tau}_2 \ \texttt{with} \ \varepsilon_1}{\hat{\Gamma} \vdash \lambda X <: \hat{\tau}_1.\hat{e} : \forall X <: \hat{\tau}_1.\hat{\tau}_2 \ \texttt{caps} \ \varepsilon_1 \ \texttt{with} \ \varnothing} \ (\varepsilon\text{-}\textsc{PolyTypeAbs})$$

$$\frac{\hat{\Gamma}, \phi \subseteq \varepsilon \vdash \hat{e} : \hat{\tau} \ \texttt{with} \ \varepsilon_1}{\hat{\Gamma} \vdash \lambda \phi \subseteq \varepsilon.\hat{e} : \forall \phi \subseteq \varepsilon.\hat{\tau} \ \texttt{caps} \ \varepsilon_1 \ \texttt{with} \ \varnothing} \ (\varepsilon\text{-}\textsc{PolyFxAbs})$$

$$\frac{\forall X <: \hat{\tau}_1.\hat{\tau}_2 \ \texttt{caps} \ \varepsilon_1 \ \texttt{with} \ \varepsilon_2 \quad \hat{\tau}' <: \hat{\tau}_1}{\hat{\Gamma} \vdash \hat{e} \ \hat{\tau}' : [\hat{\tau}'/X]\hat{\tau}_2 \ \texttt{with} \ [\hat{\tau}'/X]\varepsilon_1 \cup \varepsilon_2} \ (\varepsilon\text{-}\textsc{PolyTypeApp})$$

$$\frac{\hat{\Gamma} \vdash \hat{e} : \forall \phi \subseteq \varepsilon.\hat{\tau} \ \texttt{caps} \ \varepsilon_1 \ \texttt{with} \ \varepsilon_2 \quad \varepsilon' \subseteq \varepsilon}{\hat{\Gamma} \vdash \hat{e} \ \varepsilon : [\varepsilon'/\phi]\hat{\tau} \ \texttt{with} \ [\varepsilon'/\phi]\varepsilon_1 \cup \varepsilon_2} \ (\varepsilon\text{-}\textsc{PolyFxApp})$$

$$\frac{\texttt{effects}(\hat{\tau}) \cup \texttt{ho-effects}(\texttt{annot}(\tau, \varnothing)) \subseteq \varepsilon}{\hat{\Gamma} \vdash \hat{e} : \hat{\tau} \ \texttt{with} \ \varepsilon_1 \quad \texttt{ho-safe}(\hat{\tau}, \varepsilon) \quad x : \texttt{erase}(\hat{\tau}) \vdash e : \tau}{\hat{\Gamma} \vdash \texttt{import}(\varepsilon) \ x = \hat{e} \ \texttt{in} \ e : \texttt{annot}(\tau, \varepsilon) \ \texttt{with} \ \varepsilon \cup \varepsilon_1} \ (\varepsilon\text{-}\textsc{Import})$$

$\boxed{\texttt{safe}(\tau, \varepsilon)}$

$$\frac{}{\texttt{safe}(\{\bar{r}\}, \varepsilon)} \ (\textsc{Safe-Resource}) \quad \frac{}{\texttt{safe}(\texttt{Unit}, \varepsilon)} \ (\textsc{Safe-Unit})$$

$$\frac{\varepsilon \subseteq \varepsilon' \quad \texttt{ho-safe}(\hat{\tau}_1, \varepsilon) \quad \texttt{safe}(\hat{\tau}_2, \varepsilon)}{\texttt{safe}(\hat{\tau}_1 \rightarrow_{\varepsilon'} \hat{\tau}_2, \varepsilon)} \ (\textsc{Safe-Arrow})$$

$$\frac{\varepsilon_1 \subseteq \varepsilon \quad \texttt{safe}([\varepsilon_1/\phi]\hat{\tau}, \varepsilon)}{\texttt{safe}(\forall \phi \subseteq \varepsilon_1.\hat{\tau} \ \texttt{caps} \ \varepsilon_2, \varepsilon)} \ (\textsc{Safe-PolyFx}) \quad \frac{\texttt{ho-safe}(\hat{\tau}_1, \varepsilon) \quad \texttt{safe}([\hat{\tau}_1/X]\hat{\tau}_2, \varepsilon) \quad \varepsilon \subseteq \varepsilon_1}{\texttt{safe}(\forall X <: \hat{\tau}_1.\hat{\tau}_2 \ \texttt{caps} \ \varepsilon_2, \varepsilon)} \ (\textsc{Safe-PolyType})$$

$\boxed{\texttt{ho-safe}(\hat{\tau}, \varepsilon)}$

$$\frac{}{\texttt{ho-safe}(\{\bar{r}\}, \varepsilon)} \ (\textsc{HOSafe-Resource}) \quad \frac{}{\texttt{ho-safe}(\texttt{Unit}, \varepsilon)} \ (\textsc{HOSafe-Unit})$$

$$\frac{\texttt{safe}(\hat{\tau}_1, \varepsilon) \quad \texttt{ho-safe}(\hat{\tau}_2, \varepsilon)}{\texttt{ho-safe}(\hat{\tau}_1 \rightarrow_{\varepsilon'} \hat{\tau}_2, \varepsilon)} \ (\textsc{HOSafe-Arrow})$$

$$\frac{\varepsilon_1 \subseteq \varepsilon \quad \texttt{safe}([\varepsilon_1/\phi]\hat{\tau}, \varepsilon)}{\texttt{ho-safe}(\forall \phi \subseteq \varepsilon_1.\hat{\tau} \ \texttt{caps} \ \varepsilon_2, \varepsilon)} \ (\textsc{HOSafe-PolyFx}) \quad \frac{\texttt{safe}(\hat{\tau}_1, \varepsilon) \quad \texttt{ho-safe}([\hat{\tau}_1/X]\hat{\tau}_2, \varepsilon)}{\texttt{ho-safe}(\forall X <: \hat{\tau}_1.\hat{\tau}_2 \ \texttt{caps} \ \varepsilon_2, \varepsilon)} \ (\textsc{HOSafe-PolyType})$$

$\boxed{\hat{\Gamma} \vdash \hat{\tau} <: \hat{\tau}}$

$$\frac{}{\hat{\Gamma} \vdash \hat{\tau} <: \hat{\tau}} \text{ (S-Reflexive)} \quad \frac{\hat{\Gamma} \vdash \hat{\tau}_1 <: \hat{\tau}_2 \quad \hat{\Gamma} \vdash \hat{\tau}_2 <: \hat{\tau}_3}{\hat{\Gamma} \vdash \hat{\tau}_1 <: \hat{\tau}_3} \text{ (S-Transitive)}$$

$$\frac{r \in \overline{r_1} \implies r \in \overline{r_2}}{\hat{\Gamma} \vdash \{\overline{r_1}\} <: \{\overline{r_2}\}} \text{ (S-ResourceSet)} \quad \frac{\hat{\Gamma} \vdash \hat{\tau}_1' <: \hat{\tau}_1 \quad \hat{\Gamma} \vdash \hat{\tau}_2 <: \hat{\tau}_2' \quad \varepsilon \subseteq \varepsilon'}{\hat{\Gamma} \vdash \tau_1 \rightarrow_\varepsilon \tau_2 <: \tau_1' \rightarrow_{\varepsilon'} \tau_2'} \text{ (S-Arrow)}$$

$$\frac{\hat{\Gamma} \vdash \hat{\tau}_1' <: \hat{\tau}_1 \quad \hat{\Gamma}, Y <: \hat{\tau}_1' \vdash \hat{\tau}_2 <: \hat{\tau}_2'}{\hat{\Gamma} \vdash (\forall X <: \hat{\tau}_1.\hat{\tau}_2) <: (\forall Y <: \hat{\tau}_1'.\hat{\tau}_2')} \text{ (S-TypePoly)} \quad \frac{}{\hat{\Gamma}, X <: \hat{\tau} \vdash X <: \hat{\tau}} \text{ (S-TypeVar)}$$

4 Dynamic Rules

$$\boxed{\hat{e} \longrightarrow \hat{e} \mid \varepsilon}$$

$$\frac{\hat{e}_1 \longrightarrow \hat{e}_1' \mid \varepsilon}{\hat{e}_1 \hat{e}_2 \longrightarrow \hat{e}_1' \hat{e}_2 \mid \varepsilon} \text{ (E-App1)} \quad \frac{\hat{e}_2 \longrightarrow \hat{e}_2' \mid \varepsilon}{\hat{v}_1 \hat{e}_2 \longrightarrow \hat{v}_1 \hat{e}_2' \mid \varepsilon} \text{ (E-App2)} \quad \frac{}{(\lambda x : \hat{\tau}.\hat{e})\hat{v}_2 \longrightarrow [\hat{v}_2/x]\hat{e} \mid \varnothing} \text{ (E-App3)}$$

$$\frac{\hat{e} \rightarrow \hat{e}' \mid \varepsilon}{\hat{e}.\pi \longrightarrow \hat{e}'.\pi \mid \varepsilon} \text{ (E-OperCall1)} \quad \frac{r \in R \quad \pi \in \Pi}{r.\pi \longrightarrow \text{unit} \mid \{r.\pi\}} \text{ (E-OperCall2)}$$

$$\frac{\hat{e} \longrightarrow \hat{e}' \mid \varepsilon}{\hat{e}\ \hat{\tau} \longrightarrow \hat{e}'\ \hat{\tau} \mid \varepsilon} \text{ (E-PolyTypeApp1)} \quad \frac{}{(\lambda X.\hat{e})\hat{\tau} \longrightarrow [\hat{\tau}/X]\hat{e} \mid \varnothing} \text{ (E-PolyTypeApp2)}$$

$$\frac{\hat{e} \longrightarrow \hat{e}' \mid \varepsilon}{\hat{e}\ \hat{\tau} \longrightarrow \hat{e}'\ \hat{\tau} \mid \varepsilon} \text{ (E-PolyFxApp1)} \quad \frac{}{(\lambda \phi.\hat{e})\varepsilon \longrightarrow [\varepsilon/\phi]\hat{e} \mid \varnothing} \text{ (E-PolyFxApp2)}$$

$$\frac{\hat{e} \longrightarrow \hat{e}' \mid \varepsilon'}{\text{import}(\varepsilon_s)\ x = \hat{e}\ \text{in}\ e \longrightarrow \text{import}(\varepsilon_s)\ x = \hat{e}'\ \text{in}\ e \mid \varepsilon'} \text{ (E-Import1)}$$

$$\frac{}{\text{import}(\varepsilon_s)\ x = \hat{e}\ \text{in}\ e \longrightarrow [\hat{v}/x]\text{annot}(e, \varepsilon_s) \mid \varnothing} \text{ (E-Import2)}$$