$$\textsc{(methCall\_OS)}\quad \frac{\begin{array}{l}\lfloor a\rfloor_{\phi\cdot\chi}=\iota\\ \mathcal{M}(\mathtt{M},\chi(\iota)\downarrow_1,\mathtt{m})\ =\\ \quad\textbf{method}\ m\textbf{(}\ par_1,\dots par_n\textbf{)}\ \textbf{\{}\ stms\textbf{;}\ \textbf{return}\ a'\textbf{\}}\\ \phi''=\textbf{this}\mapsto\iota, par_1\mapsto\lfloor a_1\rfloor_{\phi\cdot\chi},\dots par_n\mapsto\lfloor a_n\rfloor_{\phi\cdot\chi}\\ M,\ \phi''\cdot\chi, stmts\ \rightsquigarrow\phi'\cdot\chi'\end{array}}{M,\ \phi\cdot\chi,\ a.m\textbf{(}\ a_1,\dots a_n\textbf{)}\ \rightsquigarrow\ \chi',\lfloor a'\rfloor_{\phi'\cdot\chi'}}$$

$$\textsc{(Arg\_OS)}\quad \frac{}{M,\ \phi\cdot\chi,\ a\ \rightsquigarrow\ \chi,\lfloor a\rfloor_{\phi\cdot\chi}}$$

$$\textsc{(New\_OS)}\quad \frac{\begin{array}{l}\iota\text{ is new in }\chi\\ \mathtt{f}_1,\dots\mathtt{f}_n\text{ are the fields defined in }C\end{array}}{\begin{array}{l}M,\ \phi\cdot\chi,\ \textbf{new}\ C\textbf{(}\ a_1,\dots a_n\textbf{)}\\ \rightsquigarrow\ \chi[\iota\mapsto(C,\mathtt{f}_1\mapsto\lfloor a_1\rfloor_{\phi,\sigma}..\mathtt{f}_n\mapsto\lfloor a_n\rfloor_{\phi,\sigma})]\end{array}}$$

$$\textsc{(varAsg-1\_OS)}\quad \frac{M,\ \phi\cdot\chi,\ e\ \rightsquigarrow\ \chi',\ val}{M,\ \phi\cdot\chi,\ \textbf{var}\ v{:=}e\ \rightsquigarrow\ \phi[v\mapsto val]\cdot\chi'}$$

$$\textsc{(varAsg-2\_OS)}\quad \frac{M,\ \phi\cdot\chi,\ e\ \rightsquigarrow\ \chi',\ val}{M,\ \phi\cdot\chi,\ v{:=}e\ \rightsquigarrow\ \phi[v\mapsto val]\cdot\chi'}$$

$$\textsc{(fieldAsg\_OS)}\quad \frac{M,\ \phi\cdot\chi,\ e\ \rightsquigarrow\ \phi\cdot\chi',\ val}{M,\ \phi\cdot\chi,\ \textbf{this}.f{:=}\ e\ \rightsquigarrow\ \phi\cdot\chi'[\phi(\textbf{this}),f\mapsto val]}$$

$$\textsc{(sequence\_OS)}\quad \frac{\begin{array}{l}M,\ \sigma, stmt\ \rightsquigarrow\ \sigma''\\ M,\ \sigma'',\ stmts\ \rightsquigarrow\ \sigma'\end{array}}{M,\ \sigma,\ stmt\,\textbf{;}\ stmts\ \rightsquigarrow\ \sigma'}$$

$$\textsc{(cond-True\_OS)}\quad \frac{\begin{array}{l}\lfloor a\rfloor_\sigma=\textbf{true}\\ M,\ \sigma,\ stmts_1\ \rightsquigarrow\ \sigma'\end{array}}{M,\ \sigma,\ \textbf{if}\ a\ \textbf{then}\ stmts_1\ \textbf{else}\ stmts_2\ \rightsquigarrow\ \sigma'}$$

$$\textsc{(cond-False\_OS)}\quad \frac{\begin{array}{l}\lfloor a\rfloor_\sigma=\textbf{false}\\ M,\ \sigma,\ stmts_2\ \rightsquigarrow\ \sigma'\end{array}}{M,\ \sigma,\ \textbf{if}\ a\ \textbf{then}\ stmts_1\ \textbf{else}\ stmts_2\ \rightsquigarrow\ \sigma'}$$

$$\textsc{(skip\_OS)}\quad \frac{}{M,\ \sigma,\ \textbf{skip}\ \rightsquigarrow\ \sigma}$$

Figure 1. Operational Semantics