Floor (integer part) taking an expression evaluating to a c.f. and yielding an integer.  $expr \leftarrow ip \{expr: expr\}$  $oxed{\left[egin{array}{c} expr \end{array}
ight]} 
ightarrow 
ight[ 
ightarrow 
ight] 
ight[ 
ight] 
ight. 
ight.$ else match |expr|  $|m+\circ \rightarrow m$ 

Fraction part taking an expression evaluating to a c.f. and yielding a c.f. 
$$expr \leftarrow fp \left\{ expr' : expr \right\}$$

$$\left\{ expr' \right\} \rightarrow \mathbf{match} \left[ expr' \mid n' + \frac{1}{n'} \rightarrow 0 + \frac{1}{n'} \right]$$

$$\left\{ expr' \right\} 
ightarrow egin{array}{l} \mathbf{match} & expr' \mid n' + rac{1}{cont'} 
ightarrow 0 + rac{1}{cont'} \ & \mathbf{else} & \mathbf{match} & expr' \mid m' + \circ 
ightarrow 0 + \circ \ & \mathbf{else} & \mathbf{fail} \end{array}$$

Reciprocal for continued fraction values 
$$expr \leftarrow recip \left\{ expr'' : expr \right\}$$

 $oxed{\left[ expr'' 
ight]^{-1}} 
ightarrow 
ight. egin{array}{c} oxed{ ext{match}} egin{array}{c} expr'' \end{array} ig| \ n'' + rac{1}{cont''} \end{array} 
ightarrow \left. egin{array}{c} oxed{ ext{if}} \ n'' = 0 \ ext{then} \ cont'' \ ext{else} \ 0 + rac{1}{n'' + rac{1}{cont''}} \end{array} 
ight) 
ight.$ 

else match 
$$expr''$$
  $| m'' + \circ \rightarrow 0 + \frac{1}{m'' + \circ}$  else fail

Add an integer (on the left) to a continued fraction 
$$expr \leftarrow plus \{int: expr, cf: expr\}$$

$$[int] \oplus^{sym} [cf]^{rel} \rightarrow [nil]$$

$$int \oplus f \cap cf \rightarrow nil$$

Negate for continued fraction values

 $expr \leftarrow negate \left\{ expr''': expr \right\}$  $- \left| \mathit{expr'''} \, \right| \, o \, \left| \, \mathbf{nil} \, \right|$