# Using HOL to study Svgar 2.0 semantics

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Four contributions were initially

simpli cations to the semantics occur if there is no non-trivial clocking, that  $\operatorname{d}\! i$  erent semantics of

The semantic embadding of

((M; w **j**= b

3.3 CTL: Sugar Optional Branching Extension (OBE)

The syntax of the Sugar

Ftidunctions B of the Sugar Foundation Language (FL) and formulas of the Optional Branching Extension (OBE), respectively.

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Corresponding to Appendix A.2 of the

The o cial semantics uses a di erent approach in which the currently active clock is an argument of the semantic function used to interpret SEREs and formulas. Proving this approach equivalent to compiling away clocks, followed by a simpler unclocked semantics, is one of the formal challenges to which we hope to submit the semantics.

#### 4.2 Finite paths

Sugar 2.0 gives a semantics to formulas

$$((M; w \overset{\mathbf{j}^{C}}{=} b) w$$

$$((M; j_{j=1}^{C!} fr1g|->fr2g) = (M; j_{j=1}^{C!} fr1g|->fr2g!)$$

$$-((M; j_{j=1}^{C} fr1g|->fr2g) ^{2} 8j 2 pl . j 2 pl )$$

$$((M; j_{\underline{j}}^{\underline{C}} [f1 \ U \ f2]) = (M; j_{\underline{j}}^{\underline{C}!} [f1$$

$$((M; j = f@c1!) = (M; j = f)$$

This semantics of FL formulas di ers from the one we originally transcribed from the Accellera submission document [6]. See the Appendix for the original semantics and Section 5 for a discussion of the di erences between it and the current semantics in Section 4.5.

### 4.6 Optional Branching Extension

The semantic function  $0\_SEM$  is de ned so that  $0\_$ 

FirstRise M c i = (M;  $(\hat{L}_M)$ 

With this, clearly (M; j=b) is not equal to (M; j=b). The solution, suggested by Cindy Eisner, is to replace the weak semantics by

(M; 
$$\mathbf{j}^{\mathbb{C}} = \mathbf{b}$$
) = 8i. FirstRise M c i ) (M;  $L_{\mathbb{M}}(\mathbf{j}) = \mathbf{b}$ )

so that we get

$$(M; j = 0) = 9i \cdot (i = 0) ^ (M; L_M(_i) = b)$$

$$(M; j = T b) = 8i \cdot (i = 0) ) (M; L_M(i) = b)$$

which makes (M; j = b)

Thus the semadtics was modi  $\operatorname{ed}$  so that all quadti cations are suitably restricted. In addition,

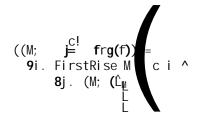
#### References

The tem-

poral logic Sugar. In G. Berry, H. Comon, and A. Finkel, editors, Proc. 13<sup>th</sup> International Computer Alder is an A. Gringauze, and Y. Rodeh.

## **APPENDIX: Initial HOL semantics**

This appendix consists of a typeset version of our initial transcription in



```
\((M; j^C f1 \cap f2) = \)
9i. FirstRise M c i
)
((M; j^C f1)
\((M; j^C f2)))
\((M; j^C X! f) = \)
9i. (FirstRise M c i
\((nite ) i < length - 1))
)
(M; j^C f1 U f2]) =
```

((M; j = fr1g - fr2g) = 9i. FirstRise M c i)

^ ((M; s **j**= [f1 U f2]) = **9** . Path M