

# Optional homework

Patrick D. Elliott

November 7, 2022

## Contents

1	Set intersection and generalized conjunction	1
2	Generalized negation	2

## 1 Set intersection and generalized conjunction

The set characterized by a function  $f : \mathbf{Dom}_\sigma \mapsto \mathbf{Dom}_E$  is defined as follows:

$$Set(f) = \{ x \in \mathbf{Dom}_\sigma \mid f(x) = \mathbf{true} \}$$

Generalized conjunction for predicates  $\sqcap_{ET}$  encodes set intersection.

Use the definition of generalized conjunction from the first handout to demonstrate that the following are equivalent:

- $Set \llbracket \mathbf{sleep}_{ET} \rrbracket \cap Set \llbracket \mathbf{laugh}_{ET} \rrbracket$
- $Set \llbracket \mathbf{sleep}_{ET} \sqcap_{ET} \mathbf{laugh}_{ET} \rrbracket$

## 2 Generalized negation

Use the definition of generalized conjunction in handout 1 as a basis for defining *generalized negation*. Use boolean negation as a base:

- **not** :  $T \rightarrow T$

Show how this accounts for predicate negation:

- “John is not tall”

Assume the translation: **not(tall)(John)**