$\widetilde{\neg}$	
$\mathbb{T}$	$\mathbb{F}$
$\mathbb{F}$	$\mathbb{T}$

$\widetilde{\land}$	$\mathbb{T}$	$\mathbb{F}$
$\mathbb{T}$	$\mathbb{T}$	$\mathbb{F}$
$\mathbb{F}$	$\mathbb{F}$	$\mathbb{F}$

$\widetilde{\lor}$	$\mathbb{T}$	$\mathbb{F}$
$\mathbb{T}$	$\mathbb{T}$	$\mathbb{T}$
$\mathbb{F}$	$\mathbb{T}$	$\mathbb{F}$

$\widetilde{\to}$	$\mathbb{T}$	$\mathbb{F}$
$\mathbb{T}$	$\mathbb{T}$	$\mathbb{F}$
$\mathbb{F}$	$\mathbb{T}$	$\mathbb{T}$

Figure 1: Truth functions for classical logic **C**.

mvl:syn:mat: fig:tf-CL

syn.1 Matrices

mvl:syn:mat: sec

A many-valued logic is defined by its language, its set of truth values V, a subset of designated truth values, and truth functions for its connective. Together, these elements are called a *matrix*.

mvl:syn:mat: defn:matrix

Definition syn.1 (Matrix). A *matrix* for the logic **L** consists of:

1. a set of connectives making up a language $\mathcal{L}$;
2. a set $V \neq \emptyset$ of truth values;
3. a set $V^+ \subseteq V$ of designated truth values;
4. for each n-place connective $\star$ in $\mathcal{L}$, a truth function $\widetilde{\star} : V^n \to V$. If $n = 0$, then $\widetilde{\star}$ is just an element of V.

Example syn.2. The matrix for classical logic **C** consists of:

1. The standard propositional language $\mathcal{L}_0$ with $\bot$, $\neg$, $\land$, $\lor$, $\to$.
2. The set of truth values $V = \{\mathbb{T}, \mathbb{F}\}$.
3. $\mathbb{T}$ is the only designated value, i.e., $V^+ = \{\mathbb{T}\}$.
4. For $\bot$, we have $\widetilde{\bot} = \mathbb{F}$. The other truth functions are given by the usual truth tables (see Figure 1).

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Bibliography