LABORATORIO 7/11/23

Esercizio 1

$\vdash A \to \neg(\neg A)$

$$\dfrac{\dfrac{\dfrac{[\neg A] \quad [A]}{\bot}\,\neg e}{\neg(\neg A)}\,\neg i}{A \to \neg(\neg A)}\,\to i$$

$\neg A \vdash A \to \bot$

$$\dfrac{\dfrac{\neg A \quad [A]}{\bot}\,\neg e}{A \to \bot}\,\to i$$

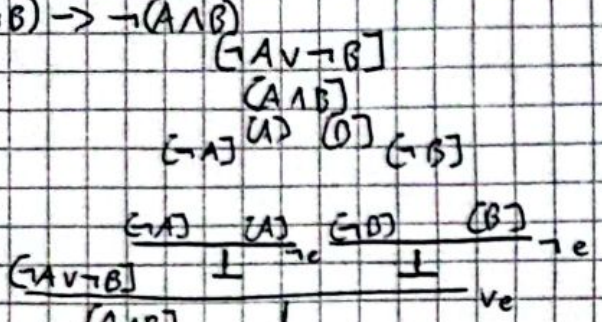
$A \to \bot \vdash \neg A$

$$\dfrac{\dfrac{A \to \bot \quad [A]}{\bot}\,\to e}{\neg A}\,\neg i$$

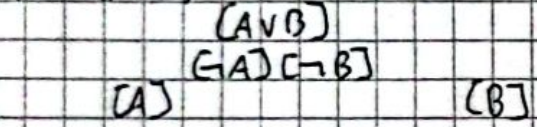
Scansionato con CamScanner

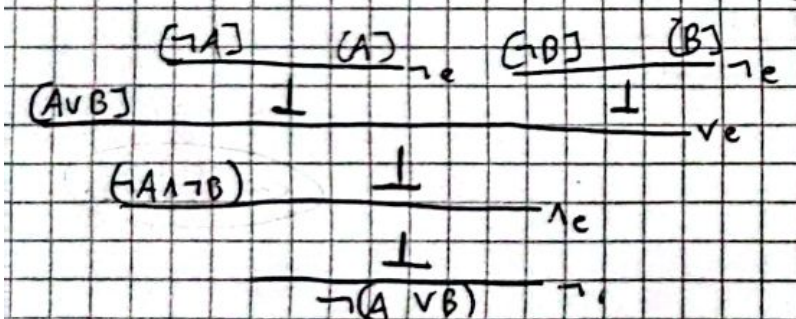
Esercizio 2

$\vdash (\neg A \vee \neg B) \to \neg(A \wedge B)$

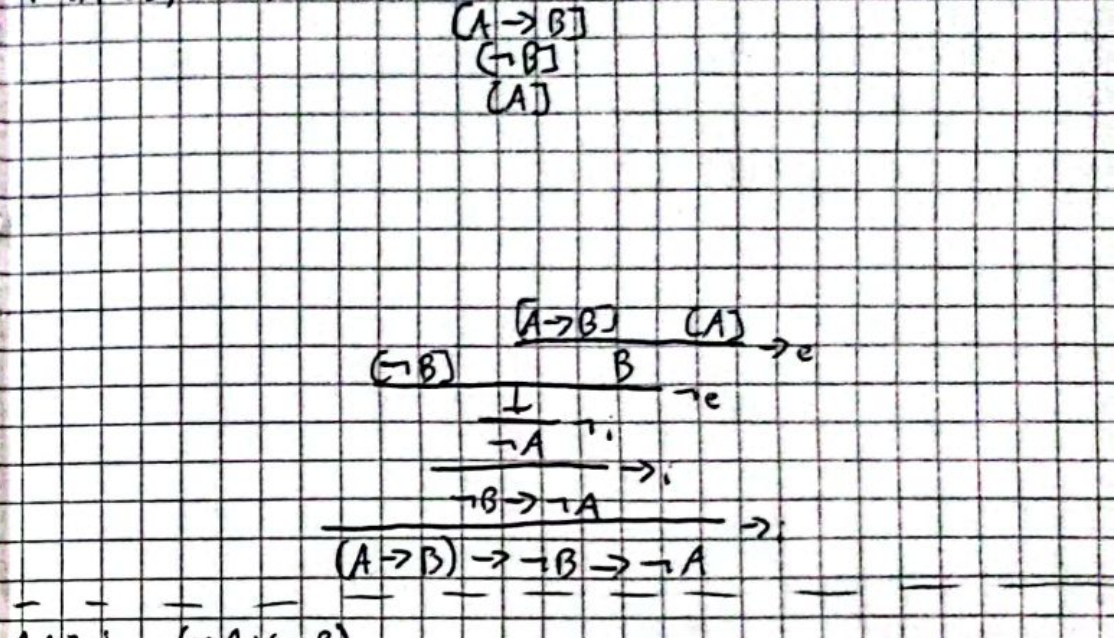


$\neg A \wedge \neg B \vdash \neg(A \vee B)$

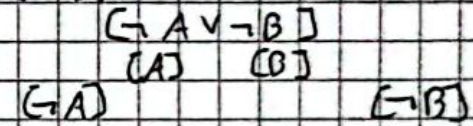


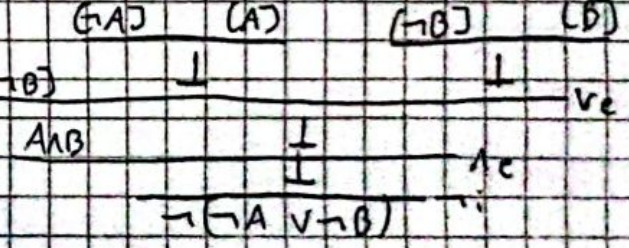


$\vdash (A \to B) \to \neg B \to \neg A$



$A \wedge B \vdash \neg(\neg A \vee \neg B)$





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Esercizio 3

$\vdash (A \to B \to C) \to (A \wedge B) \to C$

$[A \to B \to C]$
$[A \wedge B]$
$[A]\ [B]$

$$\dfrac{\dfrac{\dfrac{[A \to B \to C] \quad [A]}{B \to C}\to e \quad [B]}{C}\to e \quad [A \wedge B]}{(A \wedge B) \to C}\wedge e \to i$$
$$\dfrac{(A \wedge B) \to C}{(A \to B \to C) \to (A \wedge B) \to C} \to i$$

$\vdash ((A \wedge B) \to C) \to A \to B \to C$

$[(A \wedge B) \to C]$
$[A]$
$[B]$

$$\dfrac{\dfrac{\dfrac{[(A \wedge B) \to C] \quad \dfrac{[A] \quad [B]}{A \wedge B}\wedge i}{C}\to e}{B \to C}\to i}{A \to B \to C}\to i$$
$$\dfrac{((A \wedge B) \to C) \to A \to B \to C}{}\to i$$

$A \to B \vdash \neg C \to (A \vee C) \to \neg B \to \bot$

$[\neg C]$
$[A \vee C]$
$[\neg B]$

$[A]$ $[C]$

$$\dfrac{\dfrac{\dfrac{A \to B \quad [A]}{B}\to e \quad [\neg B]}{\bot}\neg e \quad \dfrac{[\neg C] \quad [C]}{\bot}\neg e \quad [A \vee C]}{\bot}\vee e$$
$$\dfrac{\neg B \to \bot}{(A \vee C) \to \neg B \to \bot}\to i$$
$$\dfrac{(A \vee C) \to \neg B \to \bot}{\neg C \to (A \vee C) \to \neg B \to \bot}\to i$$

Scansionato con CamScanner

Esercizio 4

$[(C \wedge G) \to E]$
$[\neg L \to E \vee C]$
$[G \vee L]$
$[\neg L]$

$[G]$ $[L]$
$[E]$ $[C]$

$$\dfrac{\dfrac{[\neg L \to E \vee C] \quad [\neg L]}{E \vee C} \to e \quad [E]}{E}\ \vee e \qquad \dfrac{\dfrac{[C] \quad [G]}{C \wedge G}\ \wedge i \quad [(C \wedge G) \to E]}{E} \to e \qquad \dfrac{[\neg L] \quad [L]}{\dfrac{\bot}{E}\ e}$$

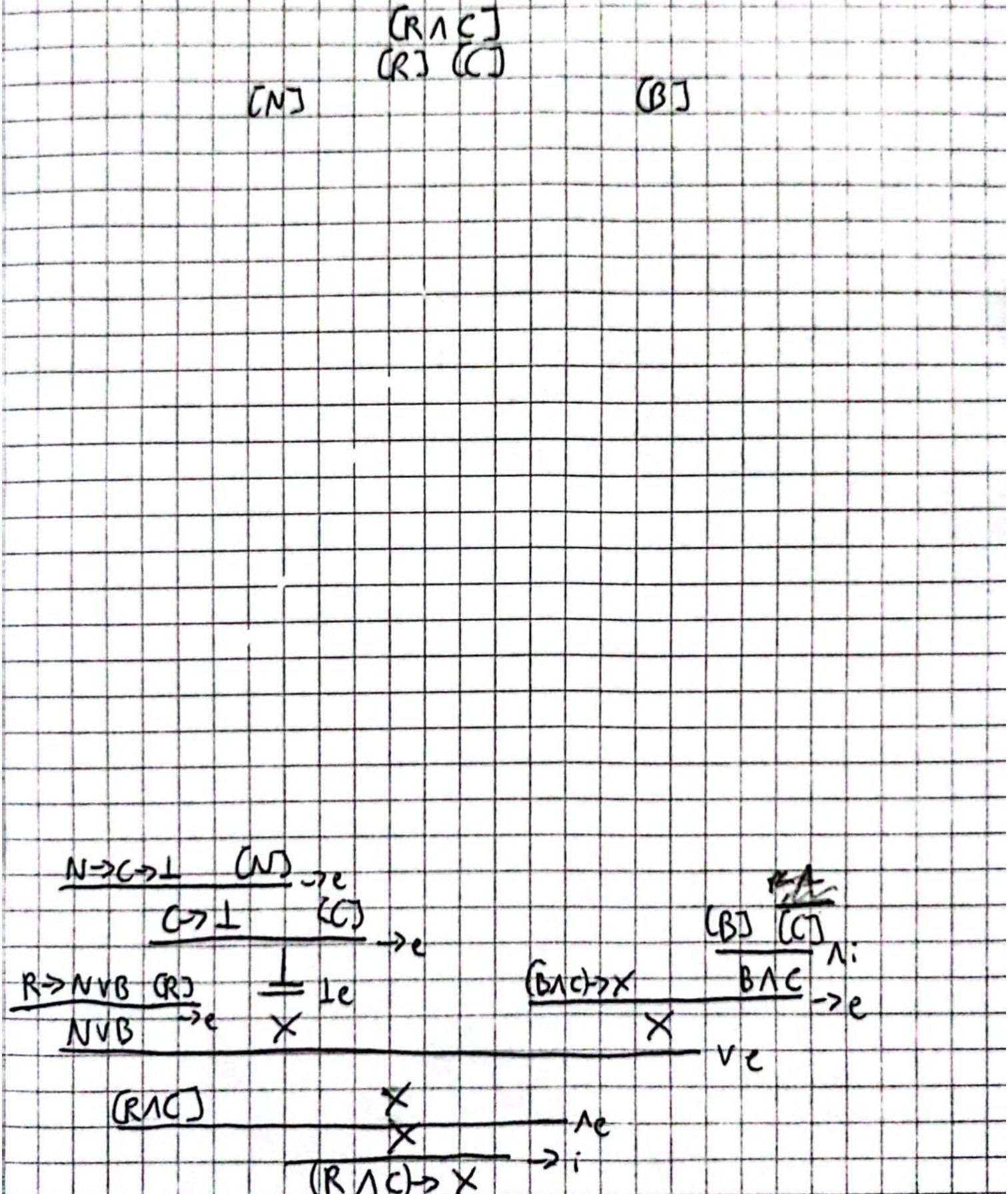
$$\dfrac{[G \vee L] \qquad E \qquad E}{E}\ \vee e$$

$$\dfrac{\dfrac{\dfrac{\dfrac{E}{\neg L \to E} \to i}{G \vee L \to \neg L \to E} \to i}{[\neg L \to E \vee C] \to G \vee L \to \neg L \to E} \to i}{(C \wedge G \to E) \to (\neg L \to E \vee C) \to G \vee L \to \neg L \to E} \to i$$

Scansionato con CamScanner

Esercizio 5

$R \to (N \vee B), N \to C \to \bot, (B \wedge C) \to X \vdash (R \wedge C) \to X$



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Esercizio 6

Sopra : S ; Sotto : $\neg S$
Campa : C ; Crepa : $\neg C$
Strega nell'armadio ; A

$S \to C$; $\neg S \to \neg C$; $A \to \neg C$; $\neg S \to \neg A \vdash A \to S$

$[A]$
$[S]$

$$\dfrac{\dfrac{\dfrac{A \to \neg C \quad [A]}{\neg C} \to e \qquad \dfrac{S \to C \quad [S]}{C} \to e}{\dfrac{\bot}{\neg S} \neg e} \neg e \qquad \neg S \to \neg A}{\dfrac{\dfrac{\neg A \qquad [A]}{\bot} \neg e}{S} \bot e}{A \to S} \to i$$

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