

Diskrečioji matematika 2015

1 individualaus namų darbas

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1 Užduotis Nr. 12.h

Irodykite tapatybę $(A \setminus B) \setminus C = (A \setminus C) \setminus (B \setminus C)$

Kaip žinoma, aibės A ir B vadinamos lygiomis, jei jų elementai sutampa, t.y. jei $A \subseteq B$ ir $B \subseteq A$, tai $A = B$

Tada įrodymas sudaro 2 dalys :

- (a): $(A \setminus B) \setminus C \subseteq (A \setminus C) \setminus (B \setminus C)$
- (b): $(A \setminus C) \setminus (B \setminus C) \subseteq (A \setminus B) \setminus C$

Nagrinėjame (a):

$$\begin{aligned} x \in (A \setminus B) \setminus C &\stackrel{1}{\implies} \\ &\stackrel{1}{\implies} x \in (A \setminus B) \wedge x \notin C \stackrel{1}{\implies} \\ &\stackrel{1}{\implies} (x \in A \wedge x \notin B) \wedge x \notin C \stackrel{1}{\implies} \\ &\stackrel{1}{\implies} x \in A \wedge (x \notin B \wedge x \notin C) \stackrel{1}{\implies} \\ &\stackrel{1}{\implies} x \in A \wedge (x \notin C \wedge x \notin B) \stackrel{1}{\implies} \\ &\stackrel{1}{\implies} (x \in A \wedge x \notin C) \wedge x \notin B \stackrel{1}{\implies} \\ &\stackrel{1}{\implies} x \in (A \setminus C) \wedge x \notin B \stackrel{1}{\implies} \\ &\stackrel{1}{\implies} \{(B \setminus C) \subseteq B \Rightarrow \text{jei } x \notin B \Rightarrow x \notin (B \setminus C)\} \stackrel{1}{\implies} \\ &\stackrel{1}{\implies} x \in (A \setminus C) \wedge x \notin (B \setminus C) \stackrel{1}{\implies} \\ &\stackrel{1}{\implies} x \in (A \setminus C) \setminus (B \setminus C) \stackrel{1}{\implies} \\ &\stackrel{1}{\implies} (A \setminus B) \setminus C \subseteq (A \setminus C) \setminus (B \setminus C) \end{aligned}$$

(b)

$$\begin{aligned}
& x \in (A \setminus C) \setminus (B \setminus C) 1 \rightarrow \\
& 1 \rightarrow [(x \in A) \wedge (x \notin C)] \wedge x \notin (B \setminus C) \Rightarrow \\
& \Rightarrow [(x \in A) \wedge (x \notin C)] \wedge x \in (B \setminus C) \Rightarrow \\
& \Rightarrow [(x \in A) \wedge (x \notin C)] \wedge [(x \in B) \wedge (x \notin C)] 2 \rightarrow \\
& 2 \rightarrow [(x \in A) \wedge (x \notin C)] \wedge [(x \notin B) \vee (x \in C)] 3 \rightarrow \\
& 3 \rightarrow \langle [(x \in A) \wedge (x \notin C)] \wedge (x \notin B) \rangle \vee \langle [(x \in A) \wedge (x \notin C)] \wedge (x \in C) \rangle 4 \rightarrow \\
& 4, 5 \rightarrow \langle (x \in A) \wedge [(x \notin C) \wedge (x \notin B)] \rangle \vee \langle (x \in A) \wedge \underbrace{false[(x \notin C) \wedge (x \in C)]}_{\text{false}} \rangle 5 \rightarrow \\
& 5 \rightarrow \langle (x \in A) \wedge [(x \notin C) \wedge (x \notin B)] \rangle \vee \underbrace{false[(x \in A) \wedge (false)]}_{\text{false}} 6 \rightarrow \\
& 6 \rightarrow (x \in A) \wedge [(x \notin C) \wedge (x \notin B)] 7 \rightarrow \\
& 7 \rightarrow (x \in A) \wedge [(x \notin B) \wedge (x \notin C)] 4 \rightarrow \\
& 4 \rightarrow [(x \in A) \wedge (x \notin B)] \wedge (x \notin C) 1 \rightarrow \\
& 1 \rightarrow x \in (A \setminus B) \wedge x \notin C 1 \rightarrow \\
& 1 \rightarrow x \in (A \setminus B) \setminus C 8 \rightarrow \\
& 8 \rightarrow (A \setminus B) \setminus (A \setminus B) \subseteq (A \setminus B) \setminus C
\end{aligned}$$

- 1- aibes skirtumo apibrezimas
2 - Konjunkcijos distributyvumas disjunkcijos atžvilgiu
 $x \wedge (y \vee z) = (x \wedge y) \vee (x \wedge z)$
3 - Morgano desnis - $\overline{x \wedge y} = \bar{x} \vee \bar{y}$
4 - Asociatyvumas - $x \wedge (y \wedge z) = (x \wedge y) \wedge z$
5 - Prestaros desnis - $x \wedge \bar{x} = 0$
6 - Konstantos savybė - $x \vee 0 = x$
7 - Komutatyvumas - $x \wedge y = y \wedge x$
8 - Poaibio apibrezimas

2 Užduotis Nr. 12.h

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