|= <= tautológia

**Cvicenie 1.1**

Skontrolujte vyroky, ktore sa daju zapisat takisto

˥AvB

A⬄¬B A-urobím skúšku z logiky

B-Dostanem FX

1.2

A=>(B=>A)

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | B=>A | A=>(B=>A) |
| 1 | 1 | 1 | 1 |
| 1 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 |

TAUTOLÓGIA (to je)

1.3

Pomocou okolností? (grécke písmeno) ukážte, že ak platí |= A a |=A=>B, tak |=B

|  |  |  |
| --- | --- | --- |
| A | B | A=>B |
| 1 | 1 | 1 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |
| 1 | 0 | 0 |

Hm nechapem

1.4

Pomocou PP dokážte

e) |= ¬¬A=>A

|  |  |  |  |
| --- | --- | --- | --- |
| A | ¬A | ¬¬A | ¬¬A=>A |
| 0 | 1 | 0 | 1 |
| 1 | 0 | 1 | 1 |

b)(A^B)=>B

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | A^B | (A^B)=>B |
| 0 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 |

1.5

c)|=(Av(BvC))=>((Bv(AvC))vA)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A | B | C | Av(BvC) | Bv(AvC))vA | Av(BvC)=((Bv(AvC))vA) |
| 0 | 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 | 1 | 1 |
| 0 | 1 | 0 | 1 | 1 | 1 |
| 0 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 | 1 | 1 |
| 1 | 0 | 1 | 1 | 1 | 1 |
| 1 | 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 |

DNF: ( ^ ^ ) v ( ^ ^) v ( ^ ) v …

KNF: ( v v ) ^ ( v v) ^ ( v ) ^ …

1.6 prepíšte do DNF

a) A=>B

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | A=>B |  |
| 0 | 0 | 1 | ¬A^¬B |
| 0 | 1 | 1 | ¬A^B |
| 1 | 0 | 0 |  |
| 1 | 1 | 1 | A^B |

^ked cheme aby bol pravdivý ten výrok (pri DNF) treba to zapísať v tom tvare (4. stlpec)

Čiže DNF: (¬A^¬B)v(¬A^B)v(A^B)

Toto DNF hore ^ je v úplnom disjunktívnom tvare, ekvivalentný výrok (ale nie úplny) by bol (¬A)v(A^B)

c) ¬(A=>(B=>A))

toto vieme, že je tautológia z predošlého cvičenia, čiže negácia tautológie je kontradikcia, preto nemá DNF

1.7

d) B=>(¬A=>B)

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | ¬A=>B | B=>(¬A=>B) |
| 1 | 1 |  | 1 |
| 1 | 0 |  | 1 |
| 0 | 1 |  | 1 |
| 0 | 0 |  | 1 |

Tautológia

e)(A^¬B)v(¬B^C)v(A^¬C)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | B | C | A^¬B | ¬B^C | A^¬C | Celé | Co nas zaujima |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | ¬Av¬Bv¬C |
| 1 | 1 | 0 | 0 | 0 | 1 | 1 |  |
| 1 | 0 | 1 | 1 | 1 | 0 | 1 |  |
| 1 | 0 | 0 | 1 | 0 | 1 | 1 |  |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | Av¬Bv¬C |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | Av¬BvC |
| 0 | 0 | 1 | 0 | 1 | 0 | 1 |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | AvBvC |

KNF: (¬Av¬Bv¬C)^(Av¬BvC)^(Av¬Bv¬C)^( ¬Av¬Bv¬C)

1.8

a) dokážte, že je tautológiou

|=(A Nor A) ⬄¬A |=(A Nand A) ⬄ ¬A

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A | A Nor A | ¬A | Cele |  | A | A Nand A | ¬A | Cele |
| 0 | 1 | 1 | 1 |  | 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |  | 1 | 0 | 1 | 1 |

Obe sú Tautológie

1.9 (¬,v,^) vieme z prednášky že je úplné

a) (¬,v) – je úplné ¬(AvB) = ¬A^¬B -deMorgan

b) (¬,^) – je taktiež úplná ¬(A^B) = ¬Av¬B -deMorgan

c) (¬,=>) – dozvieme sa že tiež

d) prepíšte do (Nor) (nestihol som )

1.10

Dokážte že nieje úplná dana množina

(^,v,=>,⬄) – všetko okrem negácie

a) ¬A

nevieme vyrobiť 0 z 1.