Laborator 2 - Temă

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Exerciţiul 1.0.1.

Să se calculeze mulţimile α_λ^+, α_λ^-, α_λ^0, $POS_\lambda(\alpha)$, $NEG_\lambda(\alpha)$ pentru următoarele reprezentări clauzele:

a) $S(\alpha) = \{a \vee b \vee \neg c, \neg b \vee d \vee \neg a, a \vee c \vee \neg b, \neg a \vee \neg c \vee b\}$ şi $\lambda_1 = a$, respectiv $\lambda_2 = \neg d$.

Pentru $\lambda = a$

$$\begin{aligned}
\alpha_\lambda^+ &= \{a \vee b \vee \neg c, a \vee c \vee \neg b\} \\
\alpha_\lambda^- &= \{\neg b \vee d \vee \neg a, \neg a \vee \neg c \vee b\} \\
\alpha_\lambda^0 &= \{\square\} \\
POS_\lambda(\alpha) &= \{\square\} \cup \{b \vee \neg c, c \vee \neg b\} \\
&= \{\square, b \vee \neg c, c \vee \neg b\} \\
NEG_\lambda(\alpha) &= \{\square\} \cup \{\neg b \vee d, \neg c \vee b\} \\
&= \{\square, \neg b \vee d, \neg c \vee b\}
\end{aligned}$$

Pentru $\lambda = \neg d$

$$\begin{aligned}
\alpha_\lambda^+ &= \{\square\} \\
\alpha_\lambda^- &= \{\neg b \vee d \vee \neg a\} \\
\alpha_\lambda^0 &= \{a \vee b \vee \neg c, a \vee c \vee \neg b, \neg a \vee \neg c \vee b\} \\
POS_\lambda(\alpha) &= \{a \vee b \vee \neg c, a \vee c \vee \neg b, \neg a \vee \neg c \vee b\} \cup \{\square\} \\
&= \{a \vee b \vee \neg c, a \vee c \vee \neg b, \neg a \vee \neg c \vee b, \square\} \\
NEG_\lambda(\alpha) &= \{a \vee b \vee \neg c, a \vee c \vee \neg b, \neg a \vee \neg c \vee b\} \cup \{\neg b \vee \neg a\} \\
&= \{a \vee b \vee \neg c, a \vee c \vee \neg b, \neg a \vee \neg c \vee b, \neg b \vee \neg a\}
\end{aligned}$$

b) $S(\alpha) = \{\neg a \vee b \vee c, \neg b \vee d \vee \neg e \vee a, \neg a \vee \neg c \vee d \vee e, b \vee c \vee a \vee e\}$ şi $\lambda_1 = \neg b$, respectiv $\lambda_2 = \neg e$.

Pentru $\lambda = \neg b$

$$\begin{aligned}
\alpha_\lambda^+ &= \{\neg b \vee d \vee \neg e \vee a\} \\
\alpha_\lambda^- &= \{\neg a \vee b \vee c, b \vee c \vee a \vee e\} \\
\alpha_\lambda^0 &= \{\neg a \vee \neg c \vee d \vee e\} \\
POS_\lambda(\alpha) &= \{\neg a \vee \neg c \vee d \vee e\} \cup \{d \vee \neg e \vee a\} \\
&= \{\neg a \vee \neg c \vee d \vee e, d \vee \neg e \vee a\} \\
NEG_\lambda(\alpha) &= \{\neg a \vee \neg c \vee d \vee e\} \cup \{\neg a \vee c, c \vee a \vee e\} \\
&= \{\neg a \vee \neg c \vee d \vee e, \neg a \vee c, c \vee a \vee e\}
\end{aligned}$$

Pentru $\lambda = \neg e$

$$
\begin{aligned}
\alpha_\lambda^+ &= \{\neg b \vee d \vee \neg e \vee a\} \\
\alpha_\lambda^- &= \{\neg a \vee \neg c \vee d \vee e, b \vee c \vee a \vee e\} \\
\alpha_\lambda^0 &= \{\neg a \vee b \vee c\} \\
POS_\lambda(\alpha) &= \{\neg a \vee b \vee c\} \cup \{\neg b \vee d \vee a\} \\
&= \{\neg a \vee b \vee c, \neg b \vee d \vee a\} \\
NEG_\lambda(\alpha) &= \{\neg a \vee b \vee c\} \cup \{\neg a \vee \neg c \vee d, b \vee c \vee a\} \\
&= \{\neg a \vee b \vee c, \neg a \vee \neg c \vee d, b \vee c \vee a\}
\end{aligned}
$$

Exerciţiul 1.0.2.

Să se calculeze mulţimile α_λ^+, α_λ^-, α_λ^0, $POS_\lambda(\alpha)$, $NEG_\lambda(\alpha)$ pentru:

a) $S(\alpha) = \{\beta \vee \omega \vee \neg\theta, \neg\omega \vee \gamma \vee \neg\beta, \beta \vee \theta \vee \neg\omega, \neg\beta \vee \neg\theta \vee \omega\}$ şi $\lambda_1 = \beta$, respectiv $\lambda_2 = \neg\gamma$.

Pentru $\lambda = \beta$

$$
\begin{aligned}
\alpha_\lambda^+ &= \{\beta \vee \omega \vee \neg\theta, \beta \vee \theta \vee \neg\omega\} \\
\alpha_\lambda^- &= \{\neg\omega \vee \gamma \vee \neg\beta, \neg\beta \vee \neg\theta \vee \omega\} \\
\alpha_\lambda^0 &= \{\square\} \\
POS_\lambda(\alpha) &= \{\square\} \cup \{\omega \vee \neg\theta, \theta \vee \neg\omega\} \\
&= \{\square, \omega \vee \neg\theta, \theta \vee \neg\omega\} \\
NEG_\lambda(\alpha) &= \{\square\} \cup \{\neg\omega \vee \gamma, \neg\theta \vee \omega\} \\
&= \{\square, \neg\omega \vee \gamma, \neg\theta \vee \omega\}
\end{aligned}
$$

Pentru $\lambda = \neg\gamma$

$$
\begin{aligned}
\alpha_\lambda^+ &= \{\square\} \\
\alpha_\lambda^- &= \{\neg\omega \vee \gamma \vee \neg\beta\} \\
\alpha_\lambda^0 &= \{\beta \vee \omega \vee \neg\theta, \beta \vee \theta \vee \neg\omega, \neg\beta \vee \neg\theta \vee \omega\} \\
POS_\lambda(\alpha) &= \{\beta \vee \omega \vee \neg\theta, \beta \vee \theta \vee \neg\omega, \neg\beta \vee \neg\theta \vee \omega\} \cup \{\square\} \\
&= \{\beta \vee \omega \vee \neg\theta, \beta \vee \theta \vee \neg\omega, \neg\beta \vee \neg\theta \vee \omega, \square\} \\
NEG_\lambda(\alpha) &= \{\beta \vee \omega \vee \neg\theta, \beta \vee \theta \vee \neg\omega, \neg\beta \vee \neg\theta \vee \omega\} \cup \{\neg\omega \vee \neg\beta\} \\
&= \{\beta \vee \omega \vee \neg\theta, \beta \vee \theta \vee \neg\omega, \neg\beta \vee \neg\theta \vee \omega, \neg\omega \vee \neg\beta\}
\end{aligned}
$$

b) $S(\alpha) = \{\neg\gamma \vee \theta \vee \psi, \neg\theta \vee \beta \vee \neg\delta \vee \gamma, \neg\gamma \vee \neg\psi \vee \beta \vee \delta, \theta \vee \psi \vee \gamma \vee \delta\}$ şi $\lambda_1 = \neg\theta$, respectiv $\lambda_2 = \neg\delta$.

Pentru $\lambda = \neg\theta$

$$
\begin{aligned}
\alpha_\lambda^+ &= \{\neg\theta \vee \beta \vee \neg\delta \vee \gamma\} \\
\alpha_\lambda^- &= \{\neg\gamma \vee \theta \vee \psi, \theta \vee \psi \vee \gamma \vee \delta\} \\
\alpha_\lambda^0 &= \{\neg\gamma \vee \neg\psi \vee \beta \vee \delta\} \\
POS_\lambda(\alpha) &= \{\neg\gamma \vee \neg\psi \vee \beta \vee \delta\} \cup \{\beta \vee \neg\delta \vee \gamma\} \\
&= \{\neg\gamma \vee \neg\psi \vee \beta \vee \delta, \beta \vee \neg\delta \vee \gamma\} \\
NEG_\lambda(\alpha) &= \{\neg\gamma \vee \neg\psi \vee \beta \vee \delta\} \cup \{\neg\gamma \vee \psi, \psi \vee \gamma \vee \delta\} \\
&= \{\neg\gamma \vee \neg\psi \vee \beta \vee \delta, \neg\gamma \vee \psi, \psi \vee \gamma \vee \delta\}
\end{aligned}
$$

Pentru $\lambda = \neg\delta$

$$
\begin{aligned}
\alpha_\lambda^+ &= \{\neg\theta \vee \beta \vee \neg\delta \vee \gamma\} \\
\alpha_\lambda^- &= \{\neg\gamma \vee \neg\psi \vee \beta \vee \delta, \theta \vee \psi \vee \gamma \vee \delta\} \\
\alpha_\lambda^0 &= \{\neg\gamma \vee \theta \vee \psi\} \\
POS_\lambda(\alpha) &= \{\neg\gamma \vee \theta \vee \psi\} \cup \{\neg\theta \vee \beta \vee \gamma\} \\
&= \{\neg\gamma \vee \theta \vee \psi, \neg\theta \vee \beta \vee \gamma\} \\
NEG_\lambda(\alpha) &= \{\neg\gamma \vee \theta \vee \psi\} \cup \{\neg\gamma \vee \neg\psi \vee \beta, \theta \vee \psi \vee \gamma\} \\
&= \{\neg\gamma \vee \theta \vee \psi, \neg\gamma \vee \neg\psi \vee \beta, \theta \vee \psi \vee \gamma\}
\end{aligned}
$$