

Prof. Dr. Alfred Toth

Antizipative Randtheorie

1. Wir gehen aus von der in Toth (2015) definierten Randrelation

$$R = U, R(U, S), S$$

und führen die PC-Differenzierung in left und right order (vgl. Kaehr 2011, S. 28) ein

$$U \rightarrow U^{\text{lo}}, U^{\text{ro}}; R \rightarrow R^{\text{lo}}, R^{\text{ro}}; S \rightarrow S^{\text{lo}}, S^{\text{ro}}.$$

Dann bekommen wir

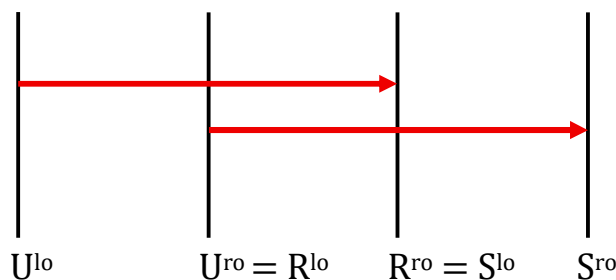
$$R = (U^{\text{lo}}, U^{\text{ro}} = R^{\text{lo}}, R^{\text{ro}} = S^{\text{lo}}, S^{\text{ro}}).$$

2. Antizipative Randrelationen

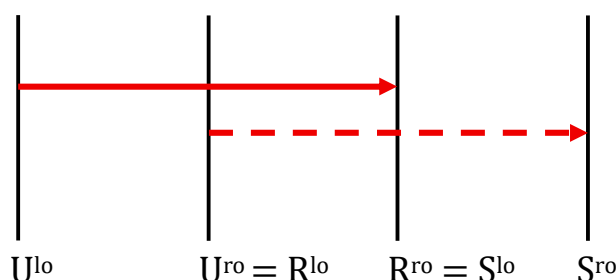
Wir konstruieren nun auf der Grundlage der vierfachen Antizipationen ontotopologische Diagramme, um alle möglichen Randrelationen über R zu visualisieren (vgl. Toth 2025a-c). Heteromorphe Abbildungen werden durch gestrichelte Pfeile markiert.

2.1. Prozipativ-externe Randrelationen

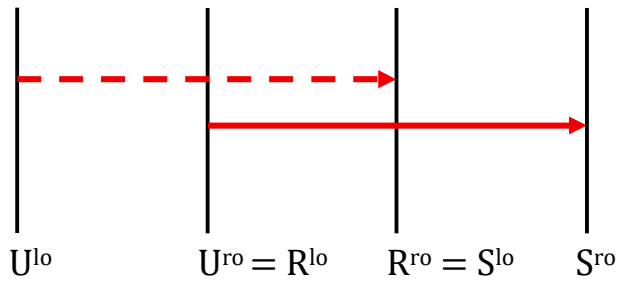
$$(U^{\text{lo}} / R^{\text{ro}} = S^{\text{lo}}), (U^{\text{ro}} = R^{\text{lo}} / S^{\text{ro}}) = (U^{\text{lo}}.R^{\text{ro}} = S^{\text{lo}}, U^{\text{ro}} = R^{\text{lo}}.S^{\text{ro}}) \rightarrow (U^{\text{lo}}.U^{\text{ro}} = R^{\text{lo}} \mid R^{\text{ro}} = S^{\text{lo}}.S^{\text{ro}})$$



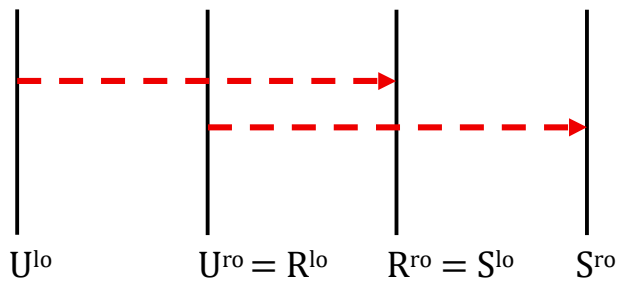
$$(U^{\text{lo}} / R^{\text{ro}} = S^{\text{lo}}), (U^{\text{ro}} = R^{\text{lo}} \setminus S^{\text{ro}}) = (U^{\text{lo}}.R^{\text{ro}} = S^{\text{lo}}, U^{\text{ro}} = R^{\text{lo}}.S^{\text{ro}}) \rightarrow (U^{\text{lo}}.U^{\text{ro}} = R^{\text{lo}} \setminus R^{\text{ro}} = S^{\text{lo}}.S^{\text{ro}} \setminus)$$



$$(Ulo \setminus Rro = Slo), (Uro = Rlo / Sro) = (Ulo \setminus Rro = Slo, Uro = Rlo.Sro) \rightarrow (Ulo.Uro = Rlo \mid Rro = Slo \setminus Sro)$$

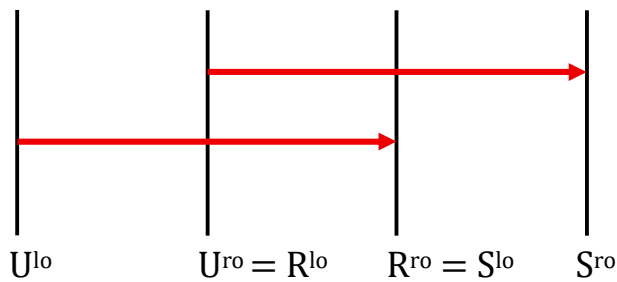


$$(Ulo \setminus Rro = Slo), (Uro = Rlo \setminus Sro) = (Ulo.Rro = Slo, Uro = Rlo.Sro) \rightarrow (Ulo \setminus Uro = Rlo \setminus \mid Rro = Slo \setminus Sro \setminus)$$

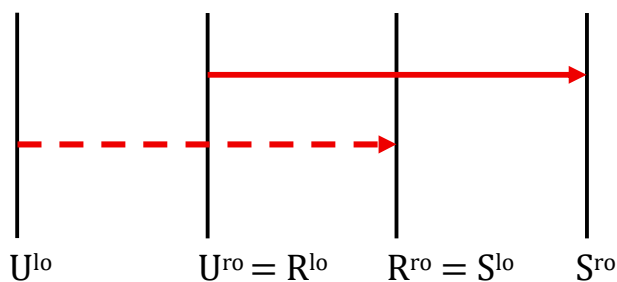


2.2. Prozipativ-interne Randrelationen

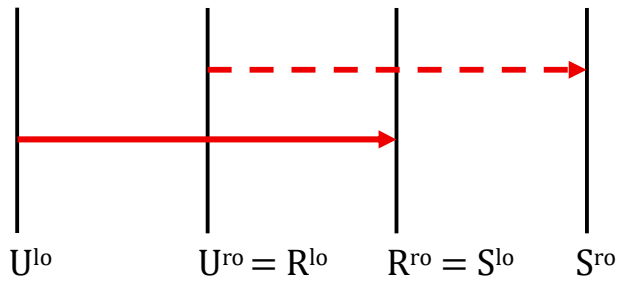
$$(Ulo / Rro = Slo), (Uro = Rlo / Sro) = (Ulo.Rro = Slo, Uro = Rlo.Sro) \rightarrow (Rro = Slo.Sro \mid Ulo.Uro = Rlo)$$



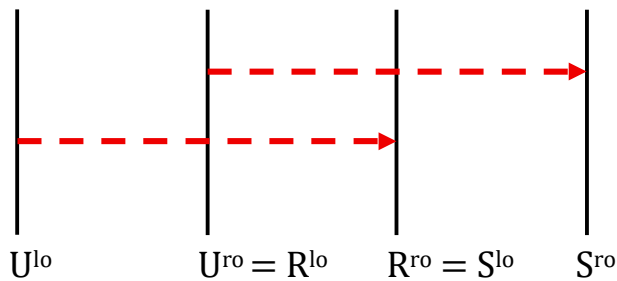
$$(Ulo / Rro = Slo), (Uro = Rlo \setminus Sro) = (Ulo.Rro = Slo, Uro = Rlo.Sro) \rightarrow (Rro = Slo.Sro \setminus \mid Ulo.Uro = Rlo \setminus)$$



$$(U_{lo} \setminus R_{ro} = S_{lo}), (U_{ro} = R_{lo} / S_{ro}) = (U_{lo}.R_{ro} = S_{lo}, U_{ro} = R_{lo}.S_{ro}) \rightarrow (R_{ro} = S_{lo} \setminus .S_{ro} \mid U_{lo} \setminus .U_{ro} = R_{lo})$$

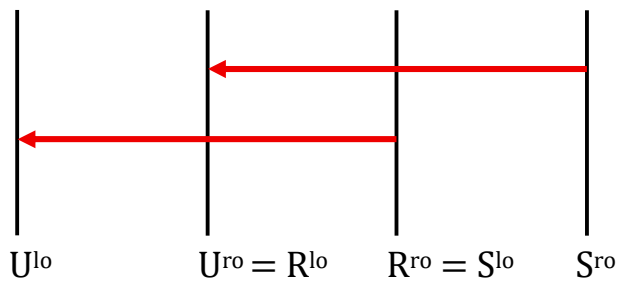


$$(U_{lo} \setminus R_{ro} = S_{lo}), (U_{ro} = R_{lo} \setminus S_{ro}) = (U_{lo}.R_{ro} = S_{lo}, U_{ro} = R_{lo}.S_{ro}) \rightarrow (R_{ro} = S_{lo} \setminus .S_{ro} \mid U_{lo} \setminus .U_{ro} = R_{lo} \setminus)$$

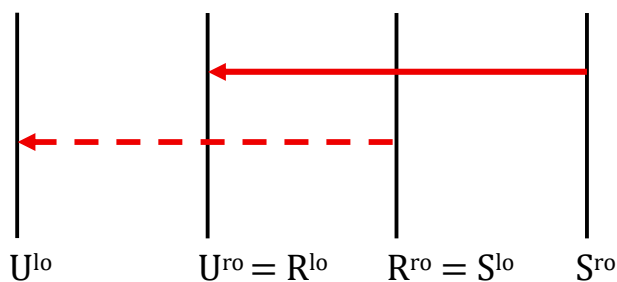


2.3. Rezipativ-externe Randrelationen

$$(U_{lo} / R_{ro} = S_{lo}), (U_{ro} = R_{lo} / S_{ro}) = (U_{lo}.R_{ro} = S_{lo}, U_{ro} = R_{lo}.S_{ro}) \rightarrow (S_{ro}.R_{ro} = S_{lo} \mid U_{ro} = R_{lo}.U_{lo})$$

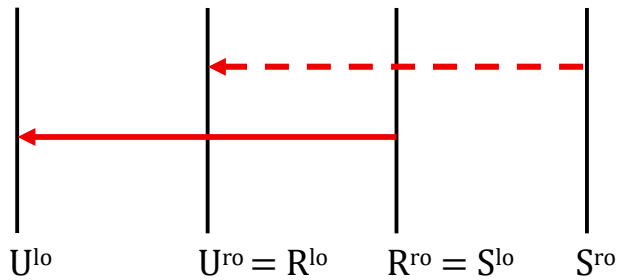


$$(U_{lo} / R_{ro} = S_{lo}), (U_{ro} = R_{lo} \setminus S_{ro}) = (U_{lo}.R_{ro} = S_{lo}, U_{ro} = R_{lo}.S_{ro}) \rightarrow (S_{ro} \setminus .R_{ro} = S_{lo} \mid U_{ro} = R_{lo} \setminus .U_{lo})$$



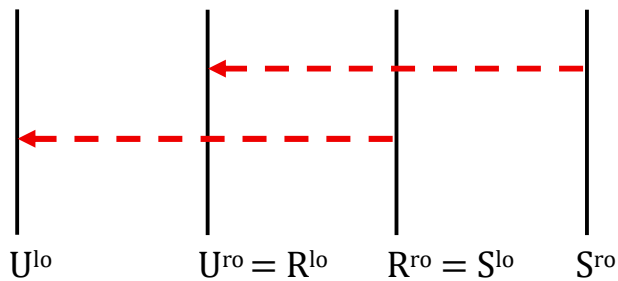
$$(U_{lo} \setminus R_{ro} = S_{lo}), (U_{ro} = R_{lo} / S_{ro}) = \\ (S_{ro}.R_{ro} = S_{lo} \setminus | U_{ro} = R_{lo}.U_{lo} \setminus)$$

$$(U_{lo}.R_{ro} = S_{lo}, U_{ro} = R_{lo}.S_{ro}) \rightarrow$$



$$(U_{lo} \setminus R_{ro} = S_{lo}), (U_{ro} = R_{lo} \setminus S_{ro}) = \\ (S_{ro} \setminus .R_{ro} = S_{lo} \setminus | U_{ro} = R_{lo} \setminus .U_{lo} \setminus)$$

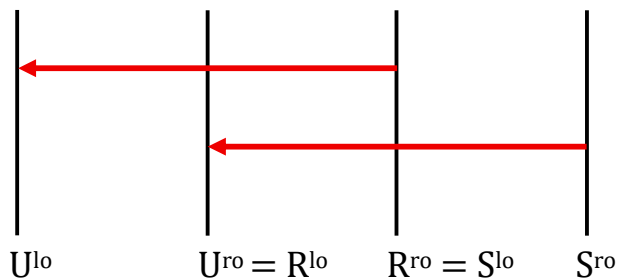
$$(U_{lo}.R_{ro} = S_{lo}, U_{ro} = R_{lo}.S_{ro}) \rightarrow$$



2.4. Rezipativ-interne Randrelationen

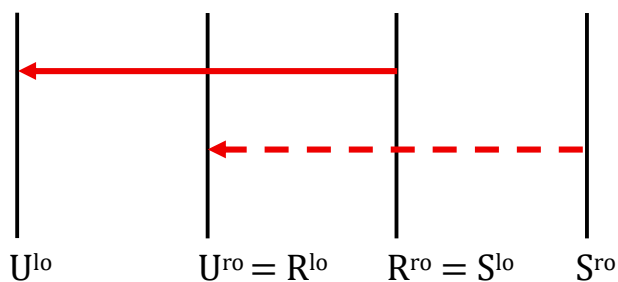
$$(U_{lo} / R_{ro} = S_{lo}), (U_{ro} = R_{lo} / S_{ro}) = \\ (U_{ro} = R_{lo}.U_{lo} | S_{ro}.R_{ro} = S_{lo})$$

$$(U_{lo}.R_{ro} = S_{lo}, U_{ro} = R_{lo}.S_{ro}) \rightarrow$$

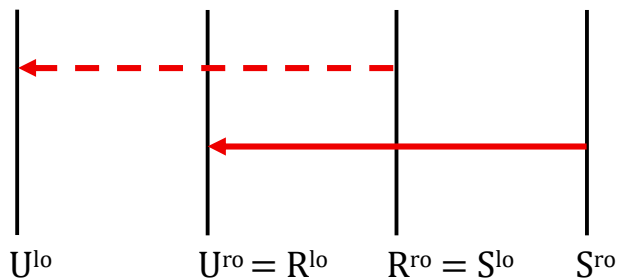


$$(U_{lo} / R_{ro} = S_{lo}), (U_{ro} = R_{lo} \setminus S_{ro}) = \\ (U_{ro} = R_{lo} \setminus .U_{lo} | S_{ro} \setminus .R_{ro} = S_{lo})$$

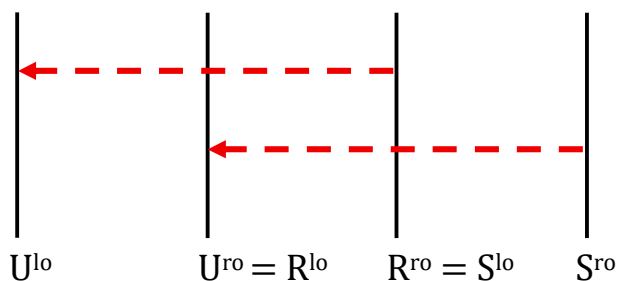
$$(U_{lo}.R_{ro} = S_{lo}, U_{ro} = R_{lo}.S_{ro}) \rightarrow$$



$$(U_{lo} \setminus R_{ro} = S_{lo}), (U_{ro} = R_{lo} / S_{ro}) = (U_{lo}.R_{ro} = S_{lo}, U_{ro} = R_{lo}.S_{ro}) \rightarrow (U_{ro} = R_{lo}.U_{lo} \setminus S_{ro}.R_{ro} = S_{lo} \setminus)$$



$$(U_{lo} \setminus R_{ro} = S_{lo}), (U_{ro} = R_{lo} \setminus S_{ro}) = (U_{lo}.R_{ro} = S_{lo}, U_{ro} = R_{lo}.S_{ro}) \rightarrow (U_{ro} = R_{lo} \setminus U_{lo} \setminus S_{ro}.R_{ro} = S_{lo} \setminus)$$



Literatur

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5.12.2025