

$$\begin{array}{ccccc}
 \overline{F}X & - & \overline{F}\text{tr}(c) & \succcurlyeq & \overline{F}A & \preccurlyeq & \overline{F}\text{tr}(d) & - & \overline{F}Y \\
 \uparrow c & & = & & \uparrow J_\nu^{-1} & & = & & \uparrow d \\
 X & - & \text{tr}(c) & \succcurlyeq & A & \preccurlyeq & \text{tr}(d) & - & Y \\
 \uparrow s & & & & \sqsubseteq & & & & \uparrow t \\
 & & & & \mathbf{1} & & & & 
 \end{array}$$

A commutative diagram illustrating relationships between variables  $X, A, Y$  and their transformed versions  $\overline{F}X, \overline{F}A, \overline{F}Y$ . The diagram is structured as follows:

- Top Row:**  $\overline{F}X$  is connected to  $\overline{F}\text{tr}(c)$  by a minus sign, which is then connected to  $\overline{F}A$  by a  $\succcurlyeq$  symbol. Similarly,  $\overline{F}A$  is connected to  $\overline{F}\text{tr}(d)$  by a  $\preccurlyeq$  symbol, which is then connected to  $\overline{F}Y$  by a minus sign.
- Middle Row:**  $X$  is connected to  $\text{tr}(c)$  by a minus sign, which is then connected to  $A$  by a  $\succcurlyeq$  symbol. Similarly,  $A$  is connected to  $\text{tr}(d)$  by a  $\preccurlyeq$  symbol, which is then connected to  $Y$  by a minus sign.
- Vertical Arrows:**
  - From  $X$  to  $\overline{F}X$ : labeled  $c$ .
  - From  $A$  to  $\overline{F}A$ : labeled  $J_\nu^{-1}$ .
  - From  $Y$  to  $\overline{F}Y$ : labeled  $d$ .
- Bottom Row:** A horizontal line labeled  $\mathbf{1}$  connects the bottom of  $X$  to the bottom of  $Y$ .
- Curved Arrows:**
  - A curved arrow labeled  $s$  points from the bottom of  $X$  to the top of  $X$ .
  - A curved arrow labeled  $t$  points from the bottom of  $Y$  to the top of  $Y$ .
- Internal Symbols:**
  - An equals sign ( $=$ ) is placed between  $\text{tr}(c)$  and  $J_\nu^{-1}$ .
  - An equals sign ( $=$ ) is placed between  $J_\nu^{-1}$  and  $\text{tr}(d)$ .
  - A square symbol ( $\sqsubseteq$ ) is placed between  $A$  and  $\mathbf{1}$ .