

Aufgabe 11-1. Setze $D_2 = \{(x, 1), (x, 4), (y, 3), (y, ?), (r, ?)\}$ und $D_3 = \{(x, 1), (x, 4), (y, 3), (y, ?), (r, 5)\}$.

$$\frac{\text{(Ass)} \frac{}{[x := 0]^1 : \{(x, ?), (y, ?), (r, ?)\} \rightarrow \{(x, 1), (y, ?), (r, ?)\}} \quad \Pi}{\text{(Seq)} \frac{}{P_2 : \{(x, ?), (y, ?), (r, ?)\} \rightarrow D_3}}$$

Dabei steht Π für die Herleitung:

$$\frac{\text{(Ass)} \frac{}{[y := x + 1]^3 : D_2 \rightarrow D_2 \setminus \{(y, ?)\}} \quad \text{(Ass)} \frac{}{[x := y * 2]^4 : D_2 \setminus \{(y, ?)\} \rightarrow D_2 \setminus \{(y, ?), (x, 1)\}}}{\text{(Seq)} \frac{\text{(Sub)} \frac{[y := x + 1]^3; [x := y * 2]^4 : D_2 \rightarrow D_2 \setminus \{(y, ?), (x, 1)\}}{[y := x + 1]^3; [x := y * 2]^4 : D_2 \rightarrow D_2}}{\text{(While)} \frac{\text{while } [x < 23]^2 \text{ do } ([y := x + 1]^3; [x := y * 2]^4) : D_2 \rightarrow D_2}}{\text{(Sub)} \frac{\text{while } [x < 23]^2 \text{ do } ([y := x + 1]^3; [x := y * 2]^4) : \{(x, 1), (y, ?), (r, ?)\} \rightarrow D_2}}{\text{(Seq)} \frac{\text{while } [x < 23]^2 \text{ do } ([y := x + 1]^3; [x := y * 2]^4); [r := y]^5 : \{(x, 1), (y, ?), (r, ?)\} \rightarrow D_3}}{\text{(Ass)} \frac{}{[r := y]^5 : D_2 \rightarrow D_3}}$$