GCLC Prover Output for conjecture “proof1”

Area method used

June 20, 2010

(1) $$(P_{ACA} + P_{BDB}) = (2 \cdot (P_{QSQ} + P_{PRP})) \quad , \text{ by the statement}$$

(2) $$(P_{ACA} + P_{BDB}) = ((2 \cdot P_{QSQ}) + (2 \cdot P_{PRP})) \quad , \text{ by algebraic simplifications}$$

(3) $$(P_{ACA} + P_{BDB}) = \left(\left(2 \cdot \left(\left(P_{QDQ} + \left(\frac{1}{2} \cdot ((P_{QAQ} + (-1 \cdot P_{QDQ})) + (2 \cdot P_{DDA}))\right)\right) + \left(-\frac{1}{4} \cdot P_{DAD}\right)\right)\right) + (2 \cdot P_{PRP})\right) \quad , \text{ by Lemma 33 (point } S \text{ eliminated)}$$

(4) $$(P_{ACA} + P_{BDB}) = \left(\left(2 \cdot \left(\left(P_{QDQ} + \left(\frac{1}{2} \cdot ((P_{QAQ} + (-1 \cdot P_{QDQ})) + (2 \cdot 0))\right)\right) + \left(-\frac{1}{4} \cdot P_{DAD}\right)\right)\right) + (2 \cdot P_{PRP})\right) \quad , \text{ by geometric simplifications}$$

(5) $$(P_{ACA} + P_{BDB}) = \left(\left((P_{QDQ} + P_{QAQ}) + \left(-\frac{1}{2} \cdot P_{DAD}\right)\right) + (2 \cdot P_{PRP})\right) \quad , \text{ by algebraic simplifications}$$

(6)
$$(P_{ACA} + P_{BDB}) = \left(\left((P_{QDQ} + P_{QAQ}) + \left(-\frac{1}{2} \cdot P_{DAD}\right)\right) + \left(2 \cdot \left(\left(P_{PCP} + \left(\frac{1}{2} \cdot ((P_{PDP} + (-1 \cdot P_{PCP})) + (2 \cdot P_{CCD}))\right)\right) + \left(-\frac{1}{4} \cdot P_{CDC}\right)\right)\right)\right), \text{ by Lemma 33 (point } R \text{ eliminated)}$$

(7) $$(P_{ACA} + P_{BDB}) = \left(\left((P_{QDQ} + P_{QAQ}) + \left(-\frac{1}{2} \cdot P_{DAD}\right)\right) + \left(2 \cdot \left(\left(P_{PCP} + \left(\frac{1}{2} \cdot ((P_{PDP} + (-1 \cdot P_{PCP})) + (2 \cdot 0))\right)\right) + \left(-\frac{1}{4} \cdot P_{CDC}\right)\right)\right)\right), \text{ by geometric simplifications}$$

(8)
$$(P_{ACA}+P_{BDB}) = \Big(\Big((P_{QDQ}+P_{QAQ})+\Big(-\frac{1}{2}\cdot P_{DAD}\Big)\Big)+\Big((P_{PCP}+P_{PDP})+\Big(-\frac{1}{2}\cdot P_{CDC}\Big)\Big)\Big), \text{ by algebraic simplifications}$$

(9)
$$(P_{ACA}+P_{BDB}) = \Big(\Big(\Big(\Big(P_{QDB}+\Big(\frac{1}{2}\cdot(P_{QDC}+(-1\cdot P_{QDB}))\Big)\Big)+P_{QAQ}\Big)+\Big(-\frac{1}{2}\cdot P_{DAD}\Big)\Big) + \Big((P_{PCP}+P_{PDP})+\Big(-\frac{1}{2}\cdot P_{CDC}\Big)\Big)\Big) \quad , \text{ by Lemma 29 (point } Q \text{ eliminated)}$$

(10)
$$(P_{ACA}+P_{BDB}) = \Big(\Big(\Big(\Big(P_{BDQ}+\Big(\frac{1}{2}\cdot(P_{CDQ}+(-1\cdot P_{BDQ}))\Big)\Big)+P_{QAQ}\Big)+\Big(-\frac{1}{2}\cdot P_{DAD}\Big)\Big) + \Big((P_{PCP}+P_{PDP})+\Big(-\frac{1}{2}\cdot P_{CDC}\Big)\Big)\Big) \quad , \text{ by geometric simplifications}$$

(11)
$$(P_{ACA}+P_{BDB}) = \Big(\Big(\Big(\Big(\Big(\frac{1}{2}\cdot P_{BDQ}\Big)+\Big(\frac{1}{2}\cdot P_{CDQ}\Big)\Big)+P_{QAQ}\Big)+\Big(-\frac{1}{2}\cdot P_{DAD}\Big)\Big) + \Big((P_{PCP}+P_{PDP})+\Big(-\frac{1}{2}\cdot P_{CDC}\Big)\Big)\Big) \quad , \text{ by algebraic simplifications}$$

(12)
$$(P_{ACA}+P_{BDB}) = \Big(\Big(\Big(\Big(\Big(\frac{1}{2}\cdot\Big(P_{BDB}+\Big(\frac{1}{2}\cdot(P_{BDC}+(-1\cdot P_{BDB}))\Big)\Big)\Big)+\Big(\frac{1}{2}\cdot P_{CDQ}\Big)\Big)+P_{QAQ}\Big)+\Big(-\frac{1}{2}\cdot P_{DAD}\Big)\Big) + \Big((P_{PCP}+P_{PDP})+\Big(-\frac{1}{2}\cdot P_{CDC}\Big)\Big)\Big) \quad , \text{ by Lemma 29 (point } Q \text{ eliminated)}$$

(13)
$$\Big(P_{ACA}+\Big(\frac{3}{4}\cdot P_{BDB}\Big)\Big) = \Big(\Big(\Big(\Big(\Big(\frac{1}{4}\cdot P_{BDC}\Big)+\Big(\frac{1}{2}\cdot P_{CDQ}\Big)\Big)+P_{QAQ}\Big)+\Big(-\frac{1}{2}\cdot P_{DAD}\Big)\Big) + \Big((P_{PCP}+P_{PDP})+\Big(-\frac{1}{2}\cdot P_{CDC}\Big)\Big)\Big) \quad , \text{ by algebraic simplifications}$$

$$\left(P_{ACA}+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{4}\cdot P_{BDC}\right)+\left(\frac{1}{2}\cdot\left(P_{CDB}+\left(\frac{1}{2}\cdot(P_{CDC}+(-1\cdot P_{CDB}))\right)\right)\right)\right)+P_{QAQ}\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)\tag{14}$$
$$+\left((P_{PCP}+P_{PDP})+\left(-\frac{1}{2}\cdot P_{CDC}\right)\right)\right) \quad , \text{ by Lemma 29 (point } Q \text{ eliminated)}$$

$$\left(P_{ACA}+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{4}\cdot P_{BDC}\right)+\left(\frac{1}{2}\cdot\left(P_{BDC}+\left(\frac{1}{2}\cdot(P_{CDC}+(-1\cdot P_{BDC}))\right)\right)\right)\right)+P_{QAQ}\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)\tag{15}$$
$$+\left((P_{PCP}+P_{PDP})+\left(-\frac{1}{2}\cdot P_{CDC}\right)\right)\right) \quad , \text{ by geometric simplifications}$$

$$\left(P_{ACA}+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+P_{QAQ}\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)\tag{16}$$
$$+(P_{PCP}+P_{PDP})\Big) \quad , \text{ by algebraic simplifications}$$

$$\left(P_{ACA}+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(P_{QAB}+\left(\frac{1}{2}\cdot(P_{QAC}+(-1\cdot P_{QAB}))\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)\tag{17}$$
$$+(P_{PCP}+P_{PDP})\Big) \quad , \text{ by Lemma 29 (point } Q \text{ eliminated)}$$

$$\left(P_{ACA}+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(P_{BAQ}+\left(\frac{1}{2}\cdot(P_{CAQ}+(-1\cdot P_{BAQ}))\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)\tag{18}$$
$$+(P_{PCP}+P_{PDP})\Big) \quad , \text{ by geometric simplifications}$$

$$\left(P_{ACA}+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{2}\cdot P_{BAQ}\right)+\left(\frac{1}{2}\cdot P_{CAQ}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)\tag{19}$$
$$+(P_{PCP}+P_{PDP})\Big) \quad , \text{ by algebraic simplifications}$$

$$\left(P_{ACA}+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{2}\cdot\left(P_{BAB}+\left(\frac{1}{2}\cdot(P_{BAC}+(-1\cdot P_{BAB}))\right)\right)\right)+\left(\frac{1}{2}\cdot P_{CAQ}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+(P_{PCP}+P_{PDP})\right) \quad (20)$$

, by Lemma 29 (point Q eliminated)

$$\left(P_{ACA}+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{4}\cdot P_{BAC}\right)\right)+\left(\frac{1}{2}\cdot P_{CAQ}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+(P_{PCP}+P_{PDP})\right) \quad (21)$$

, by algebraic simplifications

(22)

$$\left(P_{ACA}+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{4}\cdot P_{BAC}\right)\right)+\left(\frac{1}{2}\cdot\left(P_{CAB}+\left(\frac{1}{2}\cdot(P_{CAC}+(-1\cdot P_{CAB}))\right)\right)\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+(P_{PCP}+P_{PDP})\right)$$

, by Lemma 29 (point Q eliminated)

(23)

$$\left(P_{ACA}+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{4}\cdot P_{BAC}\right)\right)+\left(\frac{1}{2}\cdot\left(P_{BAC}+\left(\frac{1}{2}\cdot(P_{ACA}+(-1\cdot P_{BAC}))\right)\right)\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+(P_{PCP}+P_{PDP})\right)$$

, by geometric simplifications

$$\left(\left(\frac{3}{4}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+(P_{PCP}+P_{PDP})\right) \quad (24)$$

, by algebraic simplifications

$$\left(\left(\frac{3}{4}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+\left(\left(P_{PCA}+\left(\frac{1}{2}\cdot(P_{PCB}+(-1\cdot P_{PCA}))\right)\right)+P_{PDP}\right)\right) \quad , \quad \text{by Lemma 29 (point } P \text{ eliminated)} \tag{25}$$

$$\left(\left(\frac{3}{4}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+\left(\left(P_{ACP}+\left(\frac{1}{2}\cdot(P_{BCP}+(-1\cdot P_{ACP}))\right)\right)+P_{PDP}\right)\right) \quad , \quad \text{by geometric simplifications} \tag{26}$$

$$\left(\left(\frac{3}{4}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+\left(\left(\left(\frac{1}{2}\cdot P_{ACP}\right)+\left(\frac{1}{2}\cdot P_{BCP}\right)\right)+P_{PDP}\right)\right) \quad , \quad \text{by algebraic simplifications} \tag{27}$$

$$\left(\left(\frac{3}{4}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+\left(\left(\left(\left(\frac{1}{2}\cdot\left(P_{ACA}+\left(\frac{1}{2}\cdot(P_{ACB}+(-1\cdot P_{ACA}))\right)\right)\right)\right)+\left(\frac{1}{2}\cdot P_{BCP}\right)\right)+P_{PDP}\right)\right) \quad , \quad \text{by Lemma 29 (point } P \text{ eliminated)} \tag{28}$$

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+\left(\left(\left(\frac{1}{4}\cdot P_{ACB}\right)+\left(\frac{1}{2}\cdot P_{BCP}\right)\right)+P_{PDP}\right)\right) \quad , \quad \text{by algebraic simplifications} \tag{29}$$

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)$$
$$+\left(\left(\left(\frac{1}{4}\cdot P_{ACB}\right)+\left(\frac{1}{2}\cdot\left(P_{BCA}+\left(\frac{1}{2}\cdot\left(P_{BCB}+(-1\cdot P_{BCA})\right)\right)\right)\right)\right)\right) \tag{30}$$
$$+P_{PDP}\Big)\Big) \quad , \text{ by Lemma 29 (point } P \text{ eliminated)}$$

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)$$
$$+\left(\left(\left(\frac{1}{4}\cdot P_{ACB}\right)+\left(\frac{1}{2}\cdot\left(P_{ACB}+\left(\frac{1}{2}\cdot\left(P_{BCB}+(-1\cdot P_{ACB})\right)\right)\right)\right)\right)\right) \tag{31}$$
$$+P_{PDP}\Big)\Big) \quad , \text{ by geometric simplifications}$$

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)$$
$$+\left(\left(\left(\frac{1}{2}\cdot P_{ACB}\right)+\left(\frac{1}{4}\cdot P_{BCB}\right)\right)+P_{PDP}\right)\Big) \quad , \text{ by algebraic simplifications} \tag{32}$$

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)$$
$$+\left(\left(\left(\frac{1}{2}\cdot P_{ACB}\right)+\left(\frac{1}{4}\cdot P_{BCB}\right)\right)\right. \tag{33}$$
$$\left.+\left(P_{PDA}+\left(\frac{1}{2}\cdot\left(P_{PDB}+(-1\cdot P_{PDA})\right)\right)\right)\right)\Big) \quad , \text{ by Lemma 29 (point } P \text{ eliminated)}$$

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+\left(\left(\left(\frac{1}{2}\cdot P_{ACB}\right)+\left(\frac{1}{4}\cdot P_{BCB}\right)\right)+\left(P_{ADP}+\left(\frac{1}{2}\cdot\left(P_{BDP}+(-1\cdot P_{ADP})\right)\right)\right)\right)\right) \quad , \text{ by geometric simplifications} \tag{34}$$

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+\left(\left(\left(\frac{1}{2}\cdot P_{ACB}\right)+\left(\frac{1}{4}\cdot P_{BCB}\right)\right)+\left(\left(\frac{1}{2}\cdot P_{ADP}\right)+\left(\frac{1}{2}\cdot P_{BDP}\right)\right)\right)\right) \quad , \text{ by algebraic simplifications} \tag{35}$$

∞

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+\left(\left(\left(\frac{1}{2}\cdot P_{ACB}\right)+\left(\frac{1}{4}\cdot P_{BCB}\right)\right)+\left(\left(\frac{1}{2}\cdot\left(P_{ADA}+\left(\frac{1}{2}\cdot\left(P_{ADB}+(-1\cdot P_{ADA})\right)\right)\right)\right)+\left(\frac{1}{2}\cdot P_{BDP}\right)\right)\right)\right) \quad , \text{ by Lemma 29 (point } P \text{ eliminated)} \tag{36}$$

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(-\frac{1}{2}\cdot P_{DAD}\right)\right)+\left(\left(\left(\frac{1}{2}\cdot P_{ACB}\right)+\left(\frac{1}{4}\cdot P_{BCB}\right)\right)+\left(\left(\frac{1}{2}\cdot\left(P_{DAD}+\left(\frac{1}{2}\cdot\left(P_{ADB}+(-1\cdot P_{DAD})\right)\right)\right)\right)+\left(\frac{1}{2}\cdot P_{BDP}\right)\right)\right)\right) \quad , \text{ by geometric simplifications} \tag{37}$$

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(\left(\left(\frac{1}{2}\cdot P_{ACB}\right)+\left(\frac{1}{4}\cdot P_{BCB}\right)\right)+\left(\left(\left(\frac{1}{4}\cdot P_{ADB}\right)+\left(-\frac{1}{4}\cdot P_{DAD}\right)\right)+\left(\frac{1}{2}\cdot P_{BDP}\right)\right)\right)\right), \quad \text{by algebraic simplifications} \tag{38}$$

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(\left(\left(\frac{1}{2}\cdot P_{ACB}\right)+\left(\frac{1}{4}\cdot P_{BCB}\right)\right)+\left(\left(\left(\frac{1}{4}\cdot P_{ADB}\right)+\left(-\frac{1}{4}\cdot P_{DAD}\right)\right)+\left(\frac{1}{2}\cdot\left(P_{BDA}+\left(\frac{1}{2}\cdot(P_{BDB}+(-1\cdot P_{BDA}))\right)\right)\right)\right)\right)\right), \quad \text{by Lemma 29 (point } P \text{ eliminated)} \tag{39}$$

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{3}{4}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(\left(\left(\frac{1}{2}\cdot P_{ACB}\right)+\left(\frac{1}{4}\cdot P_{BCB}\right)\right)+\left(\left(\left(\frac{1}{4}\cdot P_{ADB}\right)+\left(-\frac{1}{4}\cdot P_{ADA}\right)\right)+\left(\frac{1}{2}\cdot\left(P_{ADB}+\left(\frac{1}{2}\cdot(P_{BDB}+(-1\cdot P_{ADB}))\right)\right)\right)\right)\right)\right), \quad \text{by geometric simplifications} \tag{40}$$

$$\left(\left(\frac{1}{2}\cdot P_{ACA}\right)+\left(\frac{1}{2}\cdot P_{BDB}\right)\right)=\left(\left(\left(\left(\frac{1}{2}\cdot P_{BDC}\right)+\left(-\frac{1}{4}\cdot P_{CDC}\right)\right)+\left(\left(\frac{1}{4}\cdot P_{BAB}\right)+\left(\frac{1}{2}\cdot P_{BAC}\right)\right)\right)+\left(\left(\left(\frac{1}{2}\cdot P_{ACB}\right)+\left(\frac{1}{4}\cdot P_{BCB}\right)\right)+\left(\left(\frac{1}{2}\cdot P_{ADB}\right)+\left(-\frac{1}{4}\cdot P_{ADA}\right)\right)\right)\right), \quad \text{by algebraic simplifications} \tag{41}$$

$$
\begin{aligned}
&\left(\left(\frac{1}{2}\cdot(2\cdot(AC\cdot AC))\right)+\left(\frac{1}{2}\cdot(2\cdot(BD\cdot BD))\right)\right)\\
&\quad=\left(\left(\left(\left(\frac{1}{2}\cdot(((BD\cdot BD)+(CD\cdot CD))+(-1\cdot(BC\cdot BC)))\right)+\left(-\frac{1}{4}\cdot(2\cdot(CD\cdot CD))\right)\right)\right.\\
&\qquad\qquad\left.+\left(\left(\frac{1}{4}\cdot(2\cdot(BA\cdot BA))\right)+\left(\frac{1}{2}\cdot(((BA\cdot BA)+(AC\cdot AC))+(-1\cdot(BC\cdot BC)))\right)\right)\right)\\
&\qquad\qquad+\left(\left(\left(\frac{1}{2}\cdot(((AC\cdot AC)+(BC\cdot BC))+(-1\cdot(BA\cdot BA)))\right)+\left(\frac{1}{4}\cdot(2\cdot(BC\cdot BC))\right)\right)\right.\\
&\qquad\left.+\left(\left(\frac{1}{2}\cdot(((AD\cdot AD)+(BD\cdot BD))+(-1\cdot(BA\cdot BA)))\right)+\left(-\frac{1}{4}\cdot(2\cdot(AD\cdot AD))\right)\right)\right)\right) \quad \text{, by geometric simplifications}
\end{aligned}
\tag{42}
$$

$$
0=0 \quad \text{, by algebraic simplifications}
\tag{43}
$$

Q.E.D.

There are no ndg conditions.
Number of elimination proof steps: 14
Number of geometric proof steps: 42
Number of algebraic proof steps: 160
Total number of proof steps: 216
Time spent by the prover: 0.008 seconds