Anharmonic Group Elements as Generated by Machine

Ed Rogers

March 2011

$$
\begin{aligned}
[-X, H_0] \quad = \quad & \lambda^2 \cdot (6 * a_2 1) \cdot (B^6 + A^6) + \lambda^2 \cdot (6 * a_1 5) \cdot (B^6 - A^6) \\
& + \lambda^2 \cdot (4 * a_2 2) \cdot (B^5 A + B A^5) + \lambda^2 \cdot (4 * a_1 6) \cdot (B^5 A - B A^5) \\
& + \lambda^2 \cdot (2 * a_2 3) \cdot (B^4 A^2 + B^2 A^4) + \lambda^2 \cdot (2 * a_1 7) \cdot (B^4 A^2 - B^2 A^4) \\
& + \lambda \cdot (4 * a_8) \cdot (B^4 + A^4) + \lambda \cdot (4 * a_5) \cdot (B^4 - A^4) \\
& + \lambda^2 \cdot (4 * a_2 4) \cdot (B^4 + A^4) + \lambda^2 \cdot (4 * a_1 8) \cdot (B^4 - A^4) \\
& + \lambda \cdot (2 * a_9) \cdot (B^3 A + B A^3) + \lambda \cdot (2 * a_6) \cdot (B^3 A - B A^3) \\
& + \lambda^2 \cdot (2 * a_2 5) \cdot (B^3 A + B A^3) + \lambda^2 \cdot (2 * a_1 9) \cdot (B^3 A - B A^3) \\
& + \lambda \cdot (2 * a_1 0) \cdot (B^2 + A^2) + \lambda \cdot (2 * a_7) \cdot (B^2 - A^2) \\
& + \lambda^2 \cdot (2 * a_2 6) \cdot (B^2 + A^2) + \lambda^2 \cdot (2 * a_2 0) \cdot (B^2 - A^2)
\end{aligned}
$$

$$
\begin{aligned}
[-X, H_0] \quad = \quad & \lambda^4\cdot(-12*a_15*a_16-12*a_21*a_22)\cdot(B^{10}+A^{10})+\lambda^4\cdot(-12*a_15*a_22-12*a_16*a_21)\cdot \\
& +\lambda^4\cdot(-48*a_15*a_17-48*a_21*a_23)\cdot(B^9A+BA^9)+\lambda^4\cdot(-48*a_15*a_23-48*a_17*a_ \\
& +\lambda^4\cdot(-12*a_16*a_17-12*a_22*a_23-108*a_14*a_15)\cdot(B^8A^2+B^2A^8)+\lambda^4\cdot(-12*a_17 \\
& +\lambda^4\cdot(-48*a_14*a_16-192*a_15*a_17+192*a_21*a_23)\cdot(B^7A^3+B^3A^7)+\lambda^4\cdot(-48*a_1^ \\
& +\lambda^4\cdot(-108*a_16*a_17+108*a_22*a_23-300*a_15*a_16+300*a_21*a_22-12*a_14*a_ \\
& +\lambda^3\cdot(-24*a_6*a_15-24*a_9*a_21)\cdot(B^8+A^8)+\lambda^3\cdot(-24*a_9*a_15-24*a_6*a_21)\cdot(B^8- \\
& +\lambda^4\cdot(-120*a_15*a_17-120*a_21*a_23-24*a_15*a_19-24*a_21*a_25)\cdot(B^8+A^8)+\lambda^4 \\
& +\lambda^3\cdot(-4*a_6*a_16-4*a_9*a_22-16*a_5*a_17-16*a_8*a_23-72*a_4*a_15)\cdot(B^7A+B \\
& +\lambda^4\cdot(-4*a_16*a_19-4*a_22*a_25-40*a_16*a_17-16*a_17*a_18-40*a_22*a_23-16 \\
& +\lambda^3\cdot(-32*a_4*a_16-144*a_6*a_15+144*a_9*a_21-48*a_5*a_14)\cdot(B^6A^2+B^2A^6)+\lambda \\
& +\lambda^4\cdot(-32*a_13*a_16-1440*a_15*a_17+1440*a_21*a_23-144*a_15*a_19+144*a_21* \\
& +\lambda^3\cdot(-84*a_6*a_16+84*a_9*a_22-8*a_4*a_17-96*a_5*a_17+96*a_8*a_23-240*a_ \\
& +\lambda^4\cdot(-84*a_16*a_19+84*a_22*a_25-3000*a_15*a_16+3000*a_21*a_22-8*a_13*a_17 \\
& +\lambda^2\cdot(-8*a_5*a_6-8*a_8*a_9-36*a_1*a_15)\cdot(B^6+A^6)+\lambda^2\cdot(-8*a_5*a_9-8*a_6*a_8 \\
& +\lambda^3\cdot(4*a_7*a_16+4*a_10*a_22-24*a_5*a_17-24*a_8*a_23-8*a_6*a_18-8*a_9*a_2 \\
& +\lambda^4\cdot(4*a_16*a_20+4*a_22*a_26-24*a_17*a_18-24*a_23*a_24-8*a_18*a_19-8*a_2 \\
& +\lambda^2\cdot(-16*a_1*a_16-32*a_4*a_5)\cdot(B^5A+BA^5)+\lambda^2\cdot(-16*a_1*a_22-32*a_4*a_8)\cdot(B^5 \\
& +\lambda^3\cdot(-16*a_3*a_16-720*a_6*a_15+720*a_9*a_21-96*a_7*a_15+96*a_10*a_21-80 \\
& +\lambda^4\cdot(-16*a_12*a_16-3840*a_15*a_17+3840*a_21*a_23-720*a_15*a_19+720*a_21* \\
& +\lambda^4\cdot(-12000*a_15*a_16+12000*a_21*a_22-4*a_12*a_17-20*a_13*a_17-1440*a_16 \\
& +\lambda^2\cdot(-4*a_1*a_17-8*a_4*a_6-72*a_5*a_6+72*a_8*a_9)\cdot(B^4A^2+B^2A^4)+\lambda^2\cdot(-4* \\
& +\lambda^3\cdot(-4*a_3*a_17-20*a_4*a_17-432*a_5*a_17+432*a_8*a_23-1800*a_5*a_15+18 \\
& +\lambda^3\cdot(-960*a_6*a_15+960*a_9*a_21-240*a_7*a_15+240*a_10*a_21-16*a_3*a_18- \\
& +\lambda^4\cdot(-2880*a_15*a_17+2880*a_21*a_23-960*a_15*a_19+960*a_21*a_25-240*a_15 \\
& +\lambda\cdot(-16*a_1*a_5)\cdot(B^4+A^4)+\lambda\cdot(-16*a_1*a_8)\cdot(B^4-A^4) \\
& +\lambda^2\cdot(-16*a_1*a_18-16*a_3*a_5-48*a_4*a_5)\cdot(B^4+A^4)+\lambda^2\cdot(-16*a_1*a_24-16*a \\
& +\lambda^4\cdot(-18000*a_15*a_16+18000*a_21*a_22-720*a_16*a_17-576*a_17*a_18+720*a_ \\
& +\lambda^3\cdot(-576*a_5*a_17+576*a_8*a_23-4800*a_5*a_15+4800*a_8*a_21-4*a_6*a_12- \\
& +\lambda\cdot(-4*a_1*a_6)\cdot(B^3A+BA^3)+\lambda\cdot(-4*a_1*a_9)\cdot(B^3A-BA^3) \\
& +\lambda^2\cdot(-4*a_3*a_6-216*a_5*a_6+216*a_8*a_9-4*a_1*a_19-48*a_5*a_7+48*a_8*a_ \\
& +\lambda^4\cdot(-7200*a_15*a_16+7200*a_21*a_22-144*a_17*a_18+144*a_23*a_24-3600*a_15 \\
& +\lambda^3\cdot(-144*a_5*a_17+144*a_8*a_23-3600*a_5*a_15+3600*a_8*a_21-144*a_6*a_18 \\
& +\lambda^2\cdot(-144*a_5*a_6+144*a_8*a_9-72*a_5*a_7+72*a_8*a_10-4*a_1*a_20-4*a_3*a \\
& +\lambda\cdot(-4*a_1*a_7)\cdot(B^2+A^2)+\lambda\cdot(-4*a_1*a_10)\cdot(B^2-A^2) \\
& +\lambda^4\cdot(-432\cdot\alpha_{15}^2+432\cdot\alpha_{21}^2-192\cdot\alpha_{16}^2+192\cdot\alpha_{22}^2-48\cdot\alpha_{17}^2+48\cdot\alpha_{23}^2)\cdot B^5A^5 \\
& +\lambda^4\cdot(-5400\cdot\alpha_{15}^2+5400\cdot\alpha_{21}^2-1600\cdot\alpha_{16}^2-320\cdot\alpha_{16}\cdot\alpha_{18}+1600\cdot\alpha_{22}^2+320\cdot\alpha_{22}\cdot\alpha_{24}-280\cdot\alpha_1^2 \\
& +\lambda^3\cdot(-320\cdot\alpha_5\cdot\alpha_{16}+320\cdot\alpha_8\cdot\alpha_{22}-80\cdot\alpha_6\cdot\alpha_{17}+80\cdot\alpha_9\cdot\alpha_{23})\cdot B^4A^4 \\
& +\lambda^4\cdot(-28800\cdot\alpha_{15}^2+28800\cdot\alpha_{21}^2-4800\cdot\alpha_{16}^2-1920\cdot\alpha_{16}\cdot\alpha_{18}+4800\cdot\alpha_{22}^2+1920\cdot\alpha_{22}\cdot\alpha_{24}-38 \\
& +\lambda^3\cdot(-1920\cdot\alpha_5\cdot\alpha_{16}+1920\cdot\alpha_8\cdot\alpha_{22}-288\cdot\alpha_6\cdot\alpha_{17}-64\cdot\alpha_7\cdot\alpha_{17}+288\cdot\alpha_9\cdot\alpha_{23}+64\cdot\alpha_{10}\cdot\alpha_{23}- \\
& +\lambda^2\cdot(-128\cdot\alpha_5^2+128\cdot\alpha_8^2-32\cdot\alpha_6^2+32\cdot\alpha_9^2)\cdot B^3A^3 \\
& +\lambda^4\cdot(-64800\cdot\alpha_{15}^2+64800\cdot\alpha_{21}^2-4800\cdot\alpha_{16}^2-3840\cdot\alpha_{16}\cdot\alpha_{18}+4800\cdot\alpha_{22}^2+3840\cdot\alpha_{22}\cdot\alpha_{24}-96 \\
& +\lambda^3\cdot(-3840\cdot\alpha_5\cdot\alpha_{16}+3840\cdot\alpha_8\cdot\alpha_{22}-192\cdot\alpha_6\cdot\alpha_{17}-96\cdot\alpha_7\cdot\alpha_{17}+192\cdot\alpha_9\cdot\alpha_{23}+96\cdot\alpha_{10}\cdot\alpha_{23}- \\
& +\lambda^2\cdot(-576\cdot\alpha_5^2+576\cdot\alpha_8^2-72\cdot\alpha_6^2-48\cdot\alpha_6\cdot\alpha_7+72\cdot\alpha_9^2+48\cdot\alpha_9\cdot\alpha_{10})\cdot B^2A^2 \\
& +\lambda^4\cdot(-51840\cdot\alpha_{15}^2+51840\cdot\alpha_{21}^2-960\cdot\alpha_{16}^2-1920\cdot\alpha_{16}\cdot\alpha_{18}+960\cdot\alpha_{22}^2+1920\cdot\alpha_{22}\cdot\alpha_{24}-768\cdot \\
& +\lambda^3\cdot(-1920\cdot\alpha_5\cdot\alpha_{16}+1920\cdot\alpha_8\cdot\alpha_{22}-1536\cdot\alpha_5\cdot\alpha_{18}+1536\cdot\alpha_8\cdot\alpha_{24}-48\cdot\alpha_6\cdot\alpha_{19}-48\cdot\alpha_6\cdot\alpha_{20}- \\
& +\lambda^2\cdot(-768\cdot\alpha_5^2+768\cdot\alpha_8^2-24\cdot\alpha_6^2-48\cdot\alpha_6\cdot\alpha_7+24\cdot\alpha_9^2+48\cdot\alpha_9\cdot\alpha_{10}-16\cdot\alpha_7^2+16\cdot\alpha_{10}^2)\cdot BA \\
& +\lambda^4\cdot(-8640\cdot\alpha_{15}^2+8640\cdot\alpha_{21}^2-192\cdot\alpha_{18}^2+192\cdot\alpha_{24}^2-8\cdot\alpha_{20}^2+8\cdot\alpha_{26}^2) \\
& +\lambda^2\cdot(-192\cdot\alpha_5^2+192\cdot\alpha_8^2-8\cdot\alpha_7^2+8\cdot\alpha_{10}^2) \\
& +\lambda^3\cdot(-384\cdot\alpha_5\cdot\alpha_{18}+384\cdot\alpha_8\cdot\alpha_{24}-16\cdot\alpha_7\cdot\alpha_{20}+16\cdot\alpha_{10}\cdot\alpha_{26})
\end{aligned}
$$