Note written by E. Salvioni on June 29, 2016.
Comparison of total cross section for $W^+ b \to Zt$ computed

1. In MadGraph5 v2.2.2, using the UFO output of the HiggsTopCurrents model. Settings in param_card:

$$\text{cutoff} = 246.2206 \text{ GeV}, \qquad \text{MB} = \text{ymb} = 4.7 \text{ GeV}, \qquad \text{MT} = \text{ymt} = 173 \text{ GeV}$$
$$\text{MZ} = 91.1876 \text{ GeV}, \qquad (\text{MW} = 79.82436 \text{ GeV}), \qquad \text{aEWM1} = 127.9,$$
$$\text{Gf} = 1.16637 \times 10^{-5}, \qquad \text{WT} = \text{WZ} = \text{WW} = 0. \tag{1}$$

For each cross section 10000 events were generated.

2. Analytically, with the same input parameters.

The results are reported in Tables 1 and 2. Agreement within the statistical uncertainty is found in all cases.

	MadGraph5	Analytical
cL1 = cL3 = cR = 0	32.65 ± 0.03	32.66
cL1 = 1, cL3 = cR = 0	72.59 ± 0.03	72.61
cL3 = 1, cL1 = cR = 0	379.1 ± 0.4	379.3
cR = 1, cL1 = cL3 = 0	37.25 ± 0.04	37.29
cL1 = −cL3 = 0.3, cR = 0.5	17.54 ± 0.01	17.55

Table 1: $\sigma(W^+ b \to Zt)$ in picobarns. The incoming energies are $E_W = 150$ GeV, $E_b = \sqrt{E_W^2 + m_b^2 - m_W^2} = 127.083$ GeV, therefore $\sqrt{s} = E_W + E_b = 277.083$ GeV.

	MadGraph5	Analytical
cL1 = cL3 = cR = 0	125.77 ± 0.23	125.78
cL1 = −1, cL3 = cR = 0	134.4 ± 0.2	134.2
cL3 = −1, cL1 = cR = 0	$2.87 \times 10^{-10} \pm 2 \times 10^{-13}$	0
cR = −1, cL1 = cL3 = 0	136.38 ± 0.30	136.25
cL1 = −cL3 = −0.4, cR = 0.5	1880.5 ± 1.7	1880.6

Table 2: $\sigma(W^+ b \to Zt)$ in picobarns. The incoming energies are $E_W = 1000$ GeV, $E_b = \sqrt{E_W^2 + m_b^2 - m_W^2} = 996.82$ GeV, therefore $\sqrt{s} = E_W + E_b = 1996.82$ GeV. For cL3 = −1 the Wtb vertex vanishes, therefore the cross section is zero.