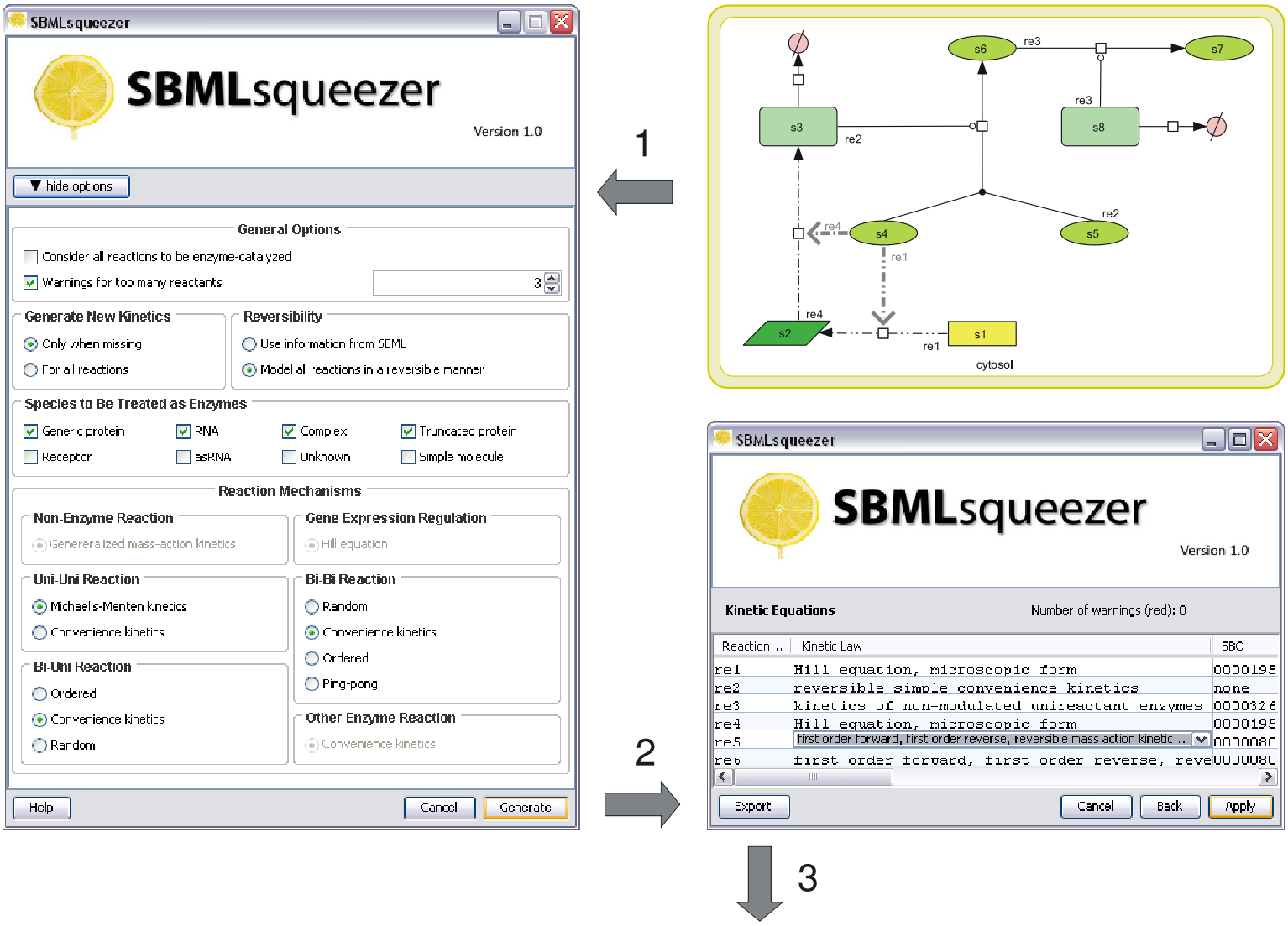

1 Rate Laws

1.1 Reaction: `re1`, Hill equation, microscopic form

$$v_1 = k_1^{\mathrm{g}} \cdot \frac{[\mathrm{s}_4]^{n+1,\mathrm{s}_4}}{[\mathrm{s}_4]^{n+1,\mathrm{s}_4} + \left(k_{+1,\mathrm{s}_4}^{\mathrm{S}}\right)^{n+1,\mathrm{s}_4}} \tag{1}$$

1.2 Reaction: `re2`, reversible simple convenience kinetics

$$v_2 = [\mathrm{s}_3] \cdot \frac{k_{+2}^{\mathrm{cat}} \cdot \frac{[\mathrm{s}_4]}{k_{2,\mathrm{s}_4}^{\mathrm{M}}} \cdot \frac{[\mathrm{s}_5]}{k_{2,\mathrm{s}_5}^{\mathrm{M}}} - k_{-2}^{\mathrm{cat}} \cdot \frac{[\mathrm{s}_6]}{k_{2,\mathrm{s}_6}^{\mathrm{M}}}}{\left(1 + \frac{[\mathrm{s}_4]}{k_{2,\mathrm{s}_4}^{\mathrm{M}}}\right)\left(1 + \frac{[\mathrm{s}_5]}{k_{2,\mathrm{s}_5}^{\mathrm{M}}}\right) + \frac{[\mathrm{s}_6]}{k_{2,\mathrm{s}_6}^{\mathrm{M}}}} \tag{2}$$

1.3 Reaction: `re3`, kinetics of non-modulated unireactant enzymes

$$v_3 = [s_8] \cdot \frac{\frac{k_{+3}^{\mathrm{cat}}}{k_{3,s_6}^{\mathrm{m}}} \cdot [s_6] - \frac{k_{-3}^{\mathrm{cat}}}{k_{3,s_7}^{\mathrm{m}}} \cdot [s_7]}{1 + \frac{[s_6]}{k_{3,s_6}^{\mathrm{m}}} + \frac{[s_7]}{k_{3,s_7}^{\mathrm{m}}}} \tag{3}$$

$$\vdots$$