Error estimate in SN photometry

$$B = Z_B + c_B(B-V) + m_B \quad (1)$$

$$V = Z_V + c_V(B-V) + m_V \quad (2)$$

(3)

$$(B-V) = \frac{Z_B - Z_V + m_B - m_V}{1-(c_B - c_V)} \quad (3)$$

(5)

$$B = Z_B + c_B\left[\frac{Z_B - Z_V + m_B - m_V}{1-(c_B - c_V)}\right] + m_B \quad (4)$$

$$V = Z_V + c_V\left[\frac{Z_B - Z_V + m_B - m_V}{1-(c_B - c_V)}\right] + m_V \quad (5)$$

$$\Delta V(Z_B, Z_V, m_B, m_V, c_B, c_V) =$$

$$= \sqrt{(\frac{\partial V}{\partial Z_B}\Delta Z_B)^2 + (\frac{\partial V}{\partial Z_V}\Delta Z_V)^2 + (\frac{\partial V}{\partial m_B}\Delta m_B)^2 + (\frac{\partial V}{\partial m_V}\Delta m_V)^2 + (\frac{\partial V}{\partial c_B}\Delta c_B)^2 + (\frac{\partial V}{\partial c_V}\Delta c_V)^2} \quad (6)$$

$$\frac{\partial V}{\partial Z_V} = (1 - \frac{c_V}{1-(c_B - c_V)}) \quad \frac{\partial V}{\partial Z_B} = (\frac{c_V}{1-(c_B - c_V)})$$

$$\frac{\partial V}{\partial m_V} = (1 - \frac{c_V}{1-(c_B - c_V)}) \quad \frac{\partial V}{\partial m_B} = (\frac{c_V}{1-(c_B - c_V)})$$

$$\frac{\partial V}{\partial c_V} = \frac{(Z_B - Z_V + m_B - m_V)\cdot(1-c_B)}{\left[1-(c_B - c_V)\right]^2}$$

$$\frac{\partial V}{\partial c_B} = \frac{(Z_B - Z_V + m_B - m_V)\cdot(c_V)}{\left[1-(c_B - c_V)\right]^2}$$

In the case we want to use V-R:

$$V = Z_V + c_V \left[\frac{Z_V - Z_R + m_V - m_R}{1-(c_V - c_R)} \right] + m_V$$

$$\frac{\partial V}{\partial Z_V} = (1 + \frac{c_V}{1-(c_V - c_R)}) \quad \frac{\partial V}{\partial Z_R} = (\frac{-c_V}{1-(c_V - c_R)})$$

$$\frac{\partial V}{\partial m_V} = (1 + \frac{c_V}{1-(c_V - c_R)}) \quad \frac{\partial V}{\partial m_R} = (\frac{-c_V}{1-(c_V - c_R)})$$

$$\frac{\partial V}{\partial c_V} = \frac{(Z_V - Z_R + m_V - m_R) \cdot (1 + c_R)}{\left[1-(c_V - c_R)\right]^2}$$

$$\frac{\partial V}{\partial c_R} = -\frac{(Z_V - Z_R + m_V - m_R) \cdot (c_V)}{\left[1-(c_V - c_R)\right]^2}$$