$$S(t) = s_0 + s_1 t + \dots$$

$$RMST(h) = \int_0^h S(t)\,dt = s_0 \cdot h + \tfrac{1}{2} s_1 \cdot h^2 + \dots$$

$$[RMSDT(h)]^2 = 2\int_0^h t \cdot S(t)\,dt - \cancel{}\,[RMST(h)]^2$$

$$= 2 \cdot \left[\tfrac{1}{2} s_0 h^2 + \tfrac{1}{3} s_1 h^3\right] - s_0^2 h^2 - 2 s_0 s_1 h^3 + \dots$$

$$= s_0(1-s_0) h^2 + 2 s_1 \left(\tfrac{1}{3} - s_0\right) h^3 + \dots$$

$$z(h) = \frac{RMST^{(1)}(h) - RMST^{(0)}(h)}{\left[\left(RMSDT^{(1)}\right)^2 + \left(RMSDT^{(0)}\right)^2\right]^{1/2}}$$

$$= \frac{\left(s_0^{(1)} - s_0^{(0)}\right) \cdot h + \tfrac{1}{2}\left(s_1^{(1)} - s_1^{(0)}\right) \cdot h^2}{\left[\left(s_0^{(1)}(1-s_0^{(1)})\right) h^2 + s_0^{(0)}(1-s_0^{(0)}) h^2 + \left(2 s_1^{(1)}\left(\tfrac{1}{3} - s_0^{(1)}\right) + 2 s_1^{(0)}\left(\tfrac{1}{3} - s_0^{(0)}\right)\right) h^3\right]^{1/2}}$$

But $s_0 = 1$. Therefore

$$z(h) = \frac{\tfrac{1}{2}\left(s_1^{(1)} - s_1^{(0)}\right) h^2}{\left[-\tfrac{2}{3}\left(s_1^{(1)} + s_1^{(0)}\right) h^3\right]^{1/2}} + \dots$$

$$\lim_{h \to 0} z(h) = O\left(h^{1/2}\right) = 0$$

(note $s_1 \leq 0$, so denominator never zero unless numerator zero)