Interval $i_1$ has center $c_1$ and percent tolerance $t_{1.}$

Interval $i_2$ has center $c_2$ and percent tolerance $t_{2.}$

The upper bound of $i_1$ is $c_1(\frac{(100+t_1)}{100})$

The lower bound of $i_1$ is $c_1(\frac{(100-t_1)}{100})$

The bounds of $i_2$ are similarly defined in terms of $c_2$ and $t_{2.}$

Let interval $i_3 =$ the product of $i_1$ and $i_{2.}$

The upper bound of $i_3 = c_3(\frac{(100+t_3)}{100})$

which is also equal to $c_1(\frac{(100+t_1)}{100})c_2(\frac{(100+t_2)}{100})$

$$c_3 \approx c_1 c_2$$

$$c_3(\frac{(100+t_3)}{100}) \approx c_3(\frac{(100+t_1)}{100})(\frac{(100+t_2)}{100})$$

$$\frac{(100+t_3)}{100} \approx (\frac{(100+t_1)}{100})(\frac{(100+t_2)}{100})$$

$$100+t_3 \approx (100+t_1)(\frac{(100+t_2)}{100})$$

$$100+t_3 \approx (100+t_1)(1+\frac{t_2}{100})$$

$$100+t_3 \approx 100+t_1+t_2+\frac{(t_1 t_2)}{100}$$

$$t_3 \approx t_1+t_2+\frac{(t_1 t_2)}{100}$$

*newpage* The lower bound of $i_3 = c_3(\frac{(100-t_3)}{100})$

which is also equal to $c_1(\frac{(100-t_1)}{100})c_2(\frac{(100-t_2)}{100})$

$$c_3 \approx c_1 c_2$$

$$c_3(\frac{(100-t_3)}{100}) \approx c_3(\frac{(100-t_1)}{100})(\frac{(100-t_2)}{100})$$

$$\frac{(100-t_3)}{100} \approx (\frac{(100-t_1)}{100})(\frac{(100-t_2)}{100})$$

$$100-t_3 \approx (100-t_1)(\frac{(100-t_2)}{100})$$

$$100-t_3 \approx (100-t_1)(1-\frac{t_2}{100})$$

$$100-t_3 \approx 100-t_1-t_2+\frac{(t_1 t_2)}{100}$$

$$-t_3 \approx -t_1-t_2+\frac{(t_1 t_2)}{100}$$

$$t_3 \approx t_1+t_2-\frac{(t_1 t_2)}{100}$$

The percent tolerance $t_3$ of the product $i_3 \approx t_1+t_2 \pm \frac{(t_1 t_2)}{100}$