Given the layer radii $x_n = x_1, x_2, \ldots, x_N$ with scattering angles $\theta_1, \theta_2, \ldots, \theta_3$, then the deviation from the ideal path $y_n$ is

$$y_n = \sum_{i=1}^{n-1} (x_n - x_i)\,\theta_i \tag{1}$$

The angles $\theta_i$ are distributed as a Gaussian, with r.m.s. such that

$$\left\langle \theta^2 \right\rangle = \left(\frac{13.6\,\mathrm{MeV}}{p}\right)^2 \frac{x}{X_0}\left[1 + 0.038\log\left(\frac{x}{X_0}\right)\right]^2 \tag{2}$$

The correlation between two deviations $y_n, y_m$ is (we will assume without loss of generality that $m \geq n$)

$$C_{n,m}\left\langle y_n y_m \right\rangle = \left\langle \sum_{i=1}^{m-1} (x_m - x_i)\,\theta_i \times \sum_{i=1}^{n-1} (x_n - x_i)\,\theta_i \right\rangle \tag{3}$$

Since the angles $\theta_i$ are uncorrelated, any term containing in $\langle \theta_i \theta_j \rangle$ with $i \neq j$ will be zero, thus

$$\begin{aligned} C_{n,m}\left\langle y_n y_m \right\rangle &= \left\langle \sum_{i=1}^{m-1}\sum_{i=1}^{n-1} (x_m - x_i)(x_n - x_i)\,\theta_i\theta_j\delta_{i,j} \right\rangle \\ &= \sum_{i=1}^{n-1} (x_m - x_i)(x_n - x_i)\left\langle \theta_i^2 \right\rangle \end{aligned} \tag{4}$$

The measurement "error" depends both on the scattering of the real track with respect to the ideal case and also on the intrinsic measurement error $\sigma_i$, which depends approximately on the strip pitch $p_i$ according to $\sigma_i = p_i/\sqrt{12}$, or $\sigma_i^2 = p_i^2/12$, thus the covariance matrix $c_{n,m}$ is

$$c_{n,m} = \begin{cases} \sum_{i=1}^{n-1} (x_m - x_i)(x_n - x_i)\left\langle \theta_i^2 \right\rangle & n < m \\ p_i^2/12 + \sum_{i=1}^{n-1} (x_n - x_i)^2\left\langle \theta_i^2 \right\rangle & n = m \\ c_{m,n} & n > m \end{cases} \tag{5}$$