The equation used to calculate the average transverse momentum on a certain (Q^2, x, z_h) bin is:

$$\langle P_T^2 \rangle = \frac{\int dP_T^2 \frac{d\sigma}{dQ^2 dx dz dP_T^2} P_T^2}{\int dP_T^2 \frac{d\sigma}{dQ^2 dx dz dP_T^2}} \tag{1}$$

Then, using SIDISs four-fold differential cross-section (Boglione,2011,eqs.17-18) we obtain:

$$\langle P_T^2 \rangle = \frac{\sum_q e_q^2 f_q(x) D_{h/q}(z) \int dP_T^2 dk_\perp^2 d\theta f'(k_\perp) \times D'(p_\perp) P_T^2}{\sum_q e_q^2 f_q(x) D_{h/q}(z) \int dP_T^2 dk_\perp^2 d\theta f'(k_\perp) \times D'(p_\perp)} \tag{2}$$

Where θ is the angle formed between $\mathbf{k}_\perp$ and $\mathbf{P}_T$ considering that they both inhabit a x-y hyperplane with the same orientation.The primed functions are the transverse momentum dependent parts of partonic and hadronic distributions. In this case we took the usual gaussian approach to represent them with the consideration that the integration of the intrinsic transverse momentum wont be up to infinity. Instead, it will be up to $k_{\perp_{MAX}}^2$:

$$f'(k_\perp) = \frac{e^{-k_\perp^2/\langle k_\perp^2 \rangle}}{\pi \langle k_\perp^2 \rangle} \frac{1}{1 - e^{-k_{\perp_{MAX}}^2/\langle k_\perp^2 \rangle}} \quad D'(p_\perp) = \frac{e^{-p_\perp^2/\langle p_\perp^2 \rangle}}{\pi \langle p_\perp^2 \rangle} \tag{3}$$

If we consider that the transverse momentum quantities are flavour independent then the integrals are fully detached from the flavour sum. Thus, the equation is simplified:

$$\langle P_T^2 \rangle = \frac{\int dP_T^2 dk_\perp^2 d\theta f'(k_\perp) \times D'(p_\perp) P_T^2}{\int dP_T^2 dk_\perp^2 d\theta f'(k_\perp) \times D'(p_\perp)} \tag{4}$$

Considering the gaussian representation of transverse momentum dependent quantities we can write the previous equation as:

$$\langle P_T^2 \rangle = \frac{\int dP_T^2 dk_\perp^2 d\theta e^{a+b+c} P_T^2}{\int dP_T^2 dk_\perp^2 d\theta e^{a+b+c}} \tag{5}$$

Where:

- $a = \frac{-P_T^2}{\langle p_\perp^2 \rangle}$
- $b = \frac{2z P_T k_\perp cos(\theta)}{\langle p_\perp^2 \rangle}$
- $c = \frac{-k_\perp^2 (\langle p_\perp^2 \rangle + z^2 \langle k_\perp^2 \rangle)}{\langle k_\perp^2 \rangle \langle p_\perp^2 \rangle}$

The limits of the integration are delimited as follow:

- $0 < k_\perp^2 < k_{\perp_{MAX}}^2$
- $0 < P_T^2 < P_{T_{MAX}}^2$ where $P_{T_{MAX}}^2$ is given by the data
- $0 < \theta < 2\pi$