# (1) n, u_par, T_perp, and T_para

All variables are function of space. Velocity integral (summation of array) gives them.

- density n:
  - simple summation of f with volume (jacobian)
  - $n = \int f \, dv_{\perp} dv_{\parallel}$
- parallel flow u_par:
  - simple summation of f with parallel velocity
  - $u_{\parallel} = \int v_{\parallel} f \, dv_{\perp} dv_{\parallel} / n$

- Perpendicular temperature
  - simple summation of perpendicular kinetic energy
  - $T_{\perp} = \int \frac{1}{2} m v_{\perp}^2 f \, dv_{\perp} dv_{\parallel} \, / n$
- Parallel temperature
  - summation of parallel kinetic energy in rest frame (u_para)
  - $T_{\perp} = \int \frac{1}{2} m (v_{\parallel} - u_{\parallel})^2 f \, dv_{\perp} dv_{\parallel} \, / n$