[tex56] **Maxwell distribution in D−dimensional space**

The Maxwell velocity distribution of an ideal gas in D-dimensional space is

$$f(\mathbf{v}) = \left(\frac{m}{2\pi k_B T}\right)^{D/2} e^{-mv^2/2k_B T},$$

where $\mathbf{v} = (v_1, \ldots, v_D)$ and $v^2 = v_1^2 + \cdots + v_D^2$. Determine the associated speed distribution $f_S(v)$, the root-mean-square speed $\sqrt{\langle v^2 \rangle}$, the average speed $\langle v \rangle$, and the most frequent speed v_0 from $df_S/dv|_{v_0} = 0$.