1. Show that \( d + \beta = 1 \) in the ballistic annihilation problem:

\[
h(t) \sim t^{-d}, \quad \text{Vrms}(t) \sim t^{-\beta}
\]

(3.60)

2. Consider inelastic collapse in the system of 2 particles:

The particles collide inelastically with one another but elastically with the walls. Both particles have \( m = 1 \), and particle-particle collisions are characterized by the dissipation parameter \( \epsilon \) defined in (3.71). Use the eigenvalue analysis outlined in the section "inelastic collapse in 1D" (3.75) to argue whether there is a critical value \( \epsilon_c \) separating inelastic collapse & finite collision sequence regimes. Discuss \( \epsilon \to 0 \) (elastic) \& \( \epsilon \to \frac{1}{2} \) (fully inelastic) limits.
Show that

\[ P(\theta, T) = \frac{2}{\pi \sqrt{T}} \frac{1}{(1 + \frac{\theta^2}{T})^2} \]  \hspace{1cm} (3.84)

satisfies the BE exactly at [\((3.77)\) rewritten in terms of \(T\)]

all times. Thus (3.84) represents its steady-state solution.