Ideal Bose-Einstein gas: isochores

Isochore at $T \geq T_c$ [tex114]:

$$
\frac{p}{p_v} = \frac{g_{D/2+1}(z)}{[g_{D/2}(z)]^{2/D+1}}, \quad \frac{T}{T_v} = \left[ g_{D/2}(z) \right]^{-2/D}.
$$

Isochore at $T \leq T_c$ (also valid asymptotically for $T \ll T_v$ in $D \leq 2$):

$$
\frac{p}{p_v} = \left( \frac{T}{T_v} \right)^{D/2+1} \zeta(D/2 + 1).
$$

Critical temperature:

$$
\frac{T_c}{T_v} = [\zeta(D/2)]^{-2/D} = \begin{cases} 
0 & D = 1 \\
0 & D = 2 \\
0.527 & D = 3 \\
1 & D = \infty 
\end{cases}
$$

High-temperature asymptotic behavior:

$$
\frac{p}{p_v} \sim \frac{T}{T_v} \left[ 1 - \frac{1}{2^{D/2+1}} \left( \frac{T_v}{T} \right)^{D/2} \right].
$$