Ideal Bose-Einstein gas: isotherms

For $D > 2$ we must again distinguish two regimes. At $v > v_c$, all bosons are in the gas phase. At $v < v_c$, a BEC is present. Only the bosons in the gas phase contribute to the pressure.

Isotherm at $v \geq v_c = \lambda_T^D / \zeta(D/2)$:

$$\frac{p}{p_T} = g_{D/2+1}(z), \quad \frac{v}{v_T} = [g_{D/2}(z)]^{-1}.$$ 

Isotherm at $v \leq v_c$:

$$\frac{p}{p_T} = \frac{p_c}{p_T} = \zeta(D/2 + 1) = \begin{cases} 2.612 & D = 1 \\ 1.645 & D = 2 \\ 1.341 & D = 3 \\ 1 & D = \infty \end{cases}$$

Critical (reduced) volume:

$$\frac{v_c}{v_T} = [\zeta(D/2)]^{-1} = \begin{cases} 0 & D = 1 \\ 0 & D = 2 \\ 0.383 & D = 3 \\ 1 & D = \infty \end{cases}$$

![Graph of isotherms for different values of D](image)