

### Volume of the n-dimensional unit sphere

$$\sum_{k=1}^n x_k^2 = 1$$

$$V_n = \frac{\pi^{\frac{n}{2}}}{\Gamma(\frac{n}{2} + 1)}$$

$$V_n = \frac{2^{1-2n} \zeta(2n) \Gamma(2n + 1)}{(-1)^{n+1} B_{2n} \pi^{\frac{3n}{2}} \Gamma(\frac{n}{2} + 1)}$$

$$V_n \sim \frac{(2e)^{\frac{n}{2}} \pi^{\frac{n-1}{2}}}{n^{\frac{n+1}{2}}}$$

$n$	
1	2
2	$\pi$
3	$\frac{4\pi}{3}$
4	$\frac{\pi^2}{2}$
5	$\frac{8\pi^2}{15}$
6	$\frac{\pi^3}{6}$
7	$\frac{16\pi^3}{105}$
8	$\frac{\pi^4}{24}$
9	$\frac{32\pi^4}{945}$

