Approximating the Gaussian CDF

- When a good approximation is sufficient, there is a relatively simple function that can be used as an approximate CDF, $\Phi(z)$.

$$\Phi(z) = \frac{1}{2}\left[1 \pm \sqrt{1 - \exp\left(\frac{-2\,z^2}{\pi}\right)}\,\right]$$

- Where the positive root is used for $z > 0$, and the negative root for $z < 0$

- The maximum errors (in probability) using this approximation are about 0.003 when $z = \pm 1.65$.