10. SUMMARY OF PROBABILTY DISTRIBUTIONS

Previous to the analysis of the data, in the present Chapter a summary of the explained theories in the present study is made. Figure 10.1 tries to clearly summarise these distributions, also reminding us what their assumptions are.

![Diagram of probability distributions](image)

In addition, as explained in Chapter 9, for the maximum variable a reduction of the number of waves should be made by the inclusion of the band-width parameter.

Below are listed the main expressions for the probability of exceedance for each distribution (for further details, see the previous chapters) in which \( h = H / \sqrt{m_0} \), \( \xi^+ = \eta_{crest} / \sqrt{m_0} \) and \( \xi^- = \eta_{trough} / \sqrt{m_0} \):
• Rayleigh

\[ P(h) = \exp \left( -\frac{h^2}{8} \right) \]  

(10.1)

• Rayleigh-Edgeworth

\[ P(h) = \exp \left( -\frac{h^2}{8} \right) \left[ 1 + \frac{1}{384} \kappa \left( h^2 - 16 \right) \right] \]  

(10.2)

• Asymmetric Rayleigh

\[ P(\xi^\pm) = \exp \left( -\frac{\xi^\pm}{2} \right) \left[ 1 \pm c_0 \lambda_3 \pm \frac{c_0 \lambda_3 \xi^\pm}{\sqrt{2}} \left( \frac{\xi^\pm}{2} - \frac{1}{2} \right) \mp c_0 \lambda_3 \text{erfc} \left( \frac{\xi^\pm}{\sqrt{2}} \right) \exp \left( \frac{\xi^\pm}{2} \right) \right] \]  

(10.3)

• Crest-to-trough

\[ P(h) = \exp \left( -\frac{h^2}{4(1 + r)} \right) \left[ 1 + \frac{1 - r^2}{4rh^2} \left( \frac{1 + r^2}{2r} \right) \right]^{1/2} \]  

(10.4)

• Modified Rayleigh I

\[ P(h) = \exp \left( -\frac{h^2}{8} \left[ 1 - \left( \frac{\pi^2}{8} - \frac{1}{2} \right) \nu^2 \right]^{-1} \right) \]  

(10.5)

• Modified Rayleigh II

\[ P(h) = \exp \left( -\frac{h^2}{4(1 - r_{\text{min}})} \right) \]  

(10.6)