Funkcje występujące we wzorach transformacyjnych zginania z udziałem dużych sił osiowych

$$l\sqrt{\frac{|S|}{EJ}} = \begin{cases} \sigma & \text{gdy } S>0 \\ \tilde{\sigma} & \text{gdy } S<0 \end{cases}$$

$$\alpha(\sigma) = \begin{cases} \sigma \dfrac{\sin\sigma - \sigma\cos\sigma}{2(1-\cos\sigma)-\sigma\sin\sigma} & \text{dla } \sigma>0, \\ 4 & \text{dla } \sigma=0, \\ \tilde{\alpha}(\tilde{\sigma}) = \tilde{\sigma}\dfrac{-sh\tilde{\sigma}+\sigma\, ch\tilde{\sigma}}{2(1-ch\tilde{\sigma})+\tilde{\sigma}\, sh\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\beta(\sigma) = \begin{cases} \sigma \dfrac{\sigma - \sin\sigma}{2(1-\cos\sigma)-\sigma\sin\sigma} & \text{dla } \sigma>0, \\ 2 & \text{dla } \sigma=0, \\ \tilde{\beta}(\tilde{\sigma}) = -\tilde{\sigma}\dfrac{\tilde{\sigma}-sh\tilde{\sigma}}{2(1-ch\tilde{\sigma})+\tilde{\sigma}\, sh\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\vartheta(\sigma) = \begin{cases} \sigma^2 \dfrac{(1-\cos\sigma)}{2(1-\cos\sigma)-\sigma\sin\sigma} & \text{dla } \sigma>0, \\ 6 & \text{dla } \sigma=0, \\ \tilde{\vartheta}(\tilde{\sigma}) = -\tilde{\sigma}^2\dfrac{(1-ch\tilde{\sigma})}{2(1-ch\tilde{\sigma})+\tilde{\sigma}\, sh\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\delta(\sigma) = \begin{cases} \dfrac{\sigma^3\sin\sigma}{2(1-\cos\sigma)-\sigma\sin\sigma} & \text{dla } \sigma>0, \\ 12 & \text{dla } \sigma=0, \\ \tilde{\delta}(\tilde{\sigma}) = \dfrac{\tilde{\sigma}^3 sh\tilde{\sigma}}{2(1-ch\tilde{\sigma})+\tilde{\sigma}\, sh\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\alpha'(\sigma) = \begin{cases} \sigma^2 \dfrac{\sin\sigma}{\sin\sigma-\sigma\cos\sigma} & \text{dla } \sigma>0, \\ 3 & \text{dla } \sigma=0, \\ \tilde{\alpha}'(\tilde{\sigma}) = -\tilde{\sigma}^2\dfrac{sh\tilde{\sigma}}{sh\tilde{\sigma}-\tilde{\sigma}\, ch\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\delta'(\sigma) = \begin{cases} \dfrac{\sigma^3\cos\sigma}{\sin\sigma-\sigma\cos\sigma} & \text{dla } \sigma>0, \\ 3 & \text{dla } \sigma=0, \\ \tilde{\delta}'(\tilde{\sigma}) = \dfrac{\tilde{\sigma}^3 ch\tilde{\sigma}}{sh\tilde{\sigma}-\tilde{\sigma}ch\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\alpha''(\sigma) = \begin{cases} \sigma \dfrac{\cos\sigma}{\sin\sigma} & \text{dla } \sigma>0, \\ 1 & \text{dla } \sigma=0, \\ \alpha''(\tilde{\sigma}) = \sigma\dfrac{ch\tilde{\sigma}}{sh\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\beta''(\sigma) = \begin{cases} \dfrac{\sigma}{\sin\sigma} & \text{dla } \sigma>0, \\ 1 & \text{dla } \sigma=0, \\ \tilde{\beta}''(\tilde{\sigma}) = \dfrac{\tilde{\sigma}}{sh\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\alpha'''(\sigma) = \begin{cases} -\sigma \dfrac{\sin\sigma}{\cos\sigma} & \text{dla } \sigma>0, \\ 0 & \text{dla } \sigma=0, \\ \tilde{\alpha}'''(\tilde{\sigma}) = \tilde{\sigma}\dfrac{sh\tilde{\sigma}}{ch\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\gamma(\sigma) = \begin{cases} \dfrac{1}{2}\dfrac{2(1-\cos\sigma)-\sigma\sin\sigma}{\sigma^2(1-\cos\sigma)} & \text{dla } \sigma>0, \\ \dfrac{1}{12} & \text{dla } \sigma=0, \\ \tilde{\gamma}(\tilde{\sigma}) = \dfrac{1}{2}\dfrac{2(1-ch\tilde{\sigma})+\sigma sh\tilde{\sigma}}{\tilde{\sigma}^2(-1+ch\tilde{\sigma})} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\gamma'(\sigma) = \begin{cases} \dfrac{1}{2}\dfrac{2(1-\cos\sigma)-\sigma\sin\sigma}{\sigma(\sin\sigma-\sigma\cos\sigma)} & \text{dla } \sigma>0, \\ \dfrac{1}{8} & \text{dla } \sigma=0, \\ \tilde{\gamma}'(\tilde{\sigma}) = \dfrac{1}{2}\dfrac{2(1-ch\tilde{\sigma})+\tilde{\sigma}\, sh\tilde{\sigma}}{\tilde{\sigma}(-sh\tilde{\sigma}+\tilde{\sigma}\, ch\tilde{\sigma})} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\gamma_i''(\sigma) = \begin{cases} \dfrac{\sin\sigma-\sigma\cos\sigma}{\sigma^2\sin\sigma} & \text{dla } \sigma>0, \\ \dfrac{1}{3} & \text{dla } \sigma=0, \\ \tilde{\gamma}_i''(\tilde{\sigma}) = \dfrac{\tilde{\sigma}\, ch\tilde{\sigma}-sh\tilde{\sigma}}{\tilde{\sigma}^2 sh\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\gamma_k''(\sigma) = \begin{cases} \dfrac{\sigma-\sin\sigma}{\sigma^2\sin\sigma} & \text{dla } \sigma>0, \\ \dfrac{1}{6} & \text{dla } \sigma=0, \\ \tilde{\gamma}_k''(\tilde{\sigma}) = -\dfrac{\tilde{\sigma}-sh\tilde{\sigma}}{\tilde{\sigma}^2 sh\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\gamma'''(\sigma) = \begin{cases} \dfrac{\sigma\sin\sigma-1+\cos\sigma}{\sigma^2\cos\sigma} & \text{dla } \sigma>0, \\ \dfrac{1}{2} & \text{dla } \sigma=0, \\ \tilde{\gamma}'''(\tilde{\sigma}) = \dfrac{\tilde{\sigma}\, sh\tilde{\sigma}+1-ch\tilde{\sigma}}{\tilde{\sigma}^2 ch\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$

$$\gamma^{IV}(\sigma) = \begin{cases} \dfrac{1-\cos\sigma}{\sigma^2\cos\sigma} & \text{dla } \sigma>0, \\ \dfrac{1}{2} & \text{dla } \sigma=0, \\ \tilde{\gamma}^{IV}(\tilde{\sigma}) = \dfrac{ch\tilde{\sigma}-1}{\tilde{\sigma}^2 ch\tilde{\sigma}} & \text{dla } \sigma=i\tilde{\sigma}. \end{cases}$$