Contents

Abbreviations

- $\mathbb{N}_0 = \mathbb{N} \cup \{0\} = \{0, 1, 2, \cdots\}$
- $\mathbb{R}_+^{n+1} = \mathbb{R}^n \times (0, \infty) = \{(x_1, x_2, \cdots, x_n, x_{n+1}) \in \mathbb{R}^{n+1} : x_{n+1} > 0\}$
- $\mathbb{N}_0^{n+1} = \{(a_1, a_2, \cdots, a_n, a_{n+1}) \in \mathbb{N}^{n+1} : a_j \in \mathbb{N}_0, \forall j = 1, 2, \cdots, n+1\}$
- $x = (x^{'}, x_{n+1}) = (x_1, x_2, \ldots, x_n, x_{n+1}) \in \mathbb{R}_+^{n+1}$
- $-x = (-x^{'}, x_{n+1}) = (-x_1, -x_2, \cdots, -x_n, x_{n+1}) \in \mathbb{R}_+^{n+1}$
- $\langle x^{'}, y^{'} \rangle = \sum_{j=1}^{n} \; x_j y_j$
- $\|x\|^2 = \sum_{j=1}^{n+1} \; x_j^2.$
- $x^\alpha = x_1^{\alpha_1} x_2^{\alpha_2} \ldots x_n^{\alpha_n} x_{n+1}^{\alpha_{n+1}}$, for $x \in \mathbb{R}_+^{n+1}$ and $\alpha \in \mathbb{N}_0^{n+1}$
- $D^\alpha = D_1^{\alpha_1} D_2^{\alpha_2} \ldots D_n^{\alpha_n} D_{n+1}^{\alpha_{n+1}}$, for $\alpha \in \mathbb{N}_0^{n+1}$
- $D_\xi^\nu = \frac{\partial^{|\nu|}}{\partial \xi_1^{\nu_1} \cdots \partial \xi_n^{\nu_n} \partial \xi_{n+1}^{\nu_{n+1}}}$, for $\nu \in \mathbb{N}_0^{n+1}$ and $|\nu| = \nu_1 + \ldots \nu_n + \nu_{n+1}$
- $\beta! = \beta_1! \beta_2! \cdots \beta_{n+1}!$, for $\beta \in \mathbb{N}_0^{n+1}$
- $\binom{\gamma}{\beta} = \binom{\gamma_1}{\beta_1}\binom{\gamma_2}{\beta_2} \cdots \binom{\gamma_n}{\beta_n}\binom{\gamma_{n+1}}{\beta_{n+1}}$, for $\gamma, \beta \in \mathbb{N}_0^{n+1}$ such that $\beta \leq \gamma$
- $C^\infty(\mathbb{R}_+^{n+1})$, the space of infinitely differentiable functions on $\mathbb{R}_+^{n+1}$
- $\hat{J}_\alpha$, the normalized Bessel function of the first kind
- $C^k(\mathbb{R}_+^{n+1})$, the space of k - times differentiable functions on $\mathbb{R}_+^{n+1}$
- $C_c^\infty(\mathbb{R}_+^{n+1})$, the space of C^∞- functions on $\mathbb{R}_+^{n+1}$ with compact support
- $S_*(\mathbb{R}_+^{n+1})$, the Schwartz space on $\mathbb{R}_+^{n+1}$
- $S_*^{\prime}(\mathbb{R}_+^{n+1})$, the dual of the Schwartz space $S_*(\mathbb{R}_+^{n+1})$