tions follow.

Consider a space of well-behaved "test" functions, $D_\infty\left(R^k\right)$ of infinitely differentiable functions with bounded support, or any of the spaces $D_m\left(R^k\right)$ of m times continuously differentiable functions (with bounded support); sometimes the domain of definition can be an open subset W of R^k, typically here $W=(0,1)^k$. Denote the generic space by $D\left(W\right)$; convergence in $D\left(W\right)$ is defined as follows: a sequence $\psi_n \in D\left(W\right)$ converges to zero if all ψ_n are defined on a common bounded support in W and ψ_n as well as all the $l-th$ order derivatives (with $l \leq m$ for D_m or all $l < \infty$ for D_∞) converge pointwise to zero. The space of generalized functions is the dual space, D^*, the space of linear continuous functionals on $D\left(W\right)$ with the weak topology: a sequence of elements of D^* converges if the sequence of values of the functionals converges for any test function from $D\left(W\right)$. The usual notation is to write the value of the functional f applied to a test function $\psi \in D\left(W\right)$ as (f,ψ); then a sequence f_n converges to f if for any ψ convergence $(f_n,\psi) \to (f,\psi)$ holds.

Assume that functions in $D\left(W\right);\ W \subseteq R^k$ are suitably differentiable, e.g. at least k times continuously differentiable. Then for any $\psi \in D\left(W\right)$, and $F \in D^*$ define a generalized derivative $f \in D^*;\ f=\frac{\partial^k}{\partial x_1 ... \partial x_k}F$ as the functional with values given by:

$$(f,\psi)=(-1)^k(F,\frac{\partial^k\psi}{\partial x_1 ... \partial x_k}). \tag{5}$$

If the right-hand side is expressed via a regular locally summable function