1) a homomorphism if for all $v_i \in V$, $i \in \underline{n} : \tau[v_1, \cdots, v_n] = [\tau(v_1), \cdots, \tau(v_n)]$;

2) an isomorphism if τ *is bijective in addition;*

3) an automorphism if $V_1 = V_2$ *and* τ *is an isomorphism.*

For the sake of convenience we introduce the following notation. Let V be an n-Lie algebra and U_i, $i \in \underline{n}$, be subspaces of V. We shall denote by $[U_1, \cdots, U_n]$ the subspace of V which is spanned by the elements of the form $[u_1, \cdots, u_n]$, $u_i \in U_i$.

Definition: *Let* V *be an* n*-Lie algebra.*

1) A subspace U *of* V *is called an* n*-Lie subalgebra if* $[U, \cdots, U] \subseteq U$.

2) A subspace I *of* V *is called an ideal of* V *if* $[I, V, \cdots, V] \subseteq I$.

3) V *is called simple if* $[V, \cdots, V] \neq \{0\}$ *and has no ideals except itself and* $\{0\}$.

Let V be an n-Lie algebra. Then

$$C(V) := \{u \in V \mid [v_1, \cdots, v_{n-1}, u] = 0, \ \forall v_i \in V, \ i \in \underline{n-1}\},$$

the centre of V, is an ideal of V. In the following we give more examples of ideals and subalgebras.

Example 1.1.4: The n-Lie algebra V in Example 1.1.3 has Kv_0 as an ideal. It is clear that the nonzero ideals of V are exactly the subspaces of V which include Kv_0.

Example 1.1.5: The subspace $\mathbb{R}[x_1, \cdots, x_n]$ of polynomial functions in the n-Lie algebra $C^\infty(\mathbb{R}^n)$ is closed with respect to the n-Lie product, therefore an n-Lie subalgebra of $C^\infty(\mathbb{R}^n)$. Moreover one can verify that for each i the set of all polynomial functions of the form $x_i f$, $f \in \mathbb{R}[x_1, \cdots, x_n]$ is a subalgebra of $\mathbb{R}[x_1, \cdots, x_n]$.

In the following proposition we list some simple properties of ideals. We shall give no proofs.

Proposition 1.1.1: *Let* V *be an* n*-Lie algebra over* K *and* I, J *be two ideals of* V*. Then the following are valid.*

1) $I + J$ *is an ideal of* V.