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論 文 要 旨

THESIS SUMMARY

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要旨（英文800語程度）
Thesis Summary（approx.800 English Words ）

In the n-dimensional complex Euclidean space, we get non-trivial self-similar solutions and translating solitons for Lagrangian mean curvature flow. Their expressions are sufficiently explicit. Those are based on a study of Joyce, Lee and Tsui, (more precisely their Ansatz). To do so we use Lemmas in Chapter 1. We also confirm that the proofs come down to that of Theorem A in the previous investigation. Hence those include examples which they have already constructed. Our new examples are Lagrangian self-similar solutions diffeomorphic to the product manifold of sphere and the Euclidean space, and Lagrangian translating solitons diffeomorphic to the Euclidean space. By restricting the constant parameters and merging a pair, we obtain a non-smooth self-expander diffeomorphic to the product manifold of sphere and the line without origin, and a non-smooth translating soliton diffeomorphic to the product manifold of the Euclidean space and the line without origin, where self-expander is the self-similar solution of expanding. Roughly speaking, the former is an example of non-smooth Lagrangian self-expander which is a pair of Lagrangian planes at infinity.
First we see the important articles that have a relationship with our results in Preface and see the manifolds which we treat are ones that are constructed by sweeping out. We notice that the study of Lagrangian mean curvature flow and mean curvature flow simply are extensively investigated. We consider submanifolds in our ambient spaces. In Chapter 1, it is the complex Euclidean space and in Chapter 2, the space is some Lagrangian submanifold which we consider in Chapter 1. It is well known that there is the standard symplectic form in the complex Euclidean space. Our Lagrangian submanifolds are Lagrangian with respect to the form. On the submanifolds we can define Lagrangian angle that is a function on it. By the function and the complex structure we can define the mean curvature vector in Lagrangian submanifolds. Note that in this thesis the position vector also means the section of the limitation of the tangent bundle of the Euclidean space to the submanifold which attain the position vector of each point and constant vector also means the constant vector field. If the mean curvature vector filed is some real constant times the orthogonal projection of the position vector to the normal bundle of the Lagrangian then the submanifold is a Lagrangian self-similar solution which is what we want to construct and if the mean curvature vector filed is the orthogonal projection of some constant vector (field) then it is a translating soliton which is also what we desire. As a trivial example, in a Lagrangian submanifold if the mean curvature vector filed is zero vector field then it is called a special Lagrangian submanifold which is volume-minimizing as well as minimal. Although the author does not describe a sufficient condition that submanifolds of the form of the Ansatz are Lagrangian, we notice that it can be computed easily. In the situation we find the condition that those Lagrangian submanifolds are self-similar solutions or translating solutions and we obtain the Lemmmas in Chapter 1. From applying the lemmas, We can get the self-expander of Lee and Wang that is given by their paper. The special Lagrangian of Lawlor also appears. We also define the Maslov class, Hamiltonian stationary. Moreover we recall the meaning of self-similar solutions and translating solitons. More precisely, Huisken show that any central blow-up of finite time singularity of the mean curvature flow is a self-similar solution and the blow-downs of translating solitons are the self-similar solutions that in fact are self-expander as it is written in Lotey and Neves's paper. We examine the fact again which that a Lagrangian submanifolds remains Lagrangian under the mean curvature flow is proved in Smoczyk's paper and the investigation of Lagrangian mean curvature flow is important. We discuss the oscillation of the Lagrangian. We see the facts that the submanifolds in Theorems in the introduction of Chapter 1 are Lagrangian self-similar solutions or translating solitons and we prove it in the sections 2 and 3. In addition we consider the mean curvature vector of submanifolds inside the Lagrangian sumanifolds that we always take, get a formula and see the claim that there is a mean curvature flow inside the Lagrangians, and the proof. In order to give the proof, we apply a lemma that the mean curvature vector of the (n-1)-dimensional round sphere with origin 0 in the n-dimensional complex Euclidean

space is minus some constant times the position vector. What is more, we confirm that there is a minimal hypersurface in the self-expander of Joyce, Lee and Tsui and that it is not only minimal but also volume-minimizing is informed. In Chapter 2 our Lagrangian is diffeomorphic to the product of sphere and line and thus we can also get some result in general product manifolds.