RESEARCH PLAN

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In future research, we aim to describe the moduli space of n-noids in detail, starting with the case of genus 0, by associating each n-noid with a complex-weighted finite graph using its relative weights. This description differs from previous ones in that it more clearly defines the points at which degeneration or collapse occurs, without relying on parameter exchanges or isometric transformations of the Euclidean 3-space. Furthermore, the results already obtained clarify that this correspondence is extremely important, as it also contains a connection to the energy form of the graph.

It seems that there appears to be no previous research on this topic at present. Indeed, much excellent research has already been conducted on n-noids in general, both in the embedded cases and the flat-ended cases. However, not much is known about non-embedded or non-flat-ended surfaces. One of the goals of this research is to broaden the scope somewhat and reexamine known results from a different perspective.

On the other hand, as research progresses, as seen in research on indexes and nullities for instance, it is becoming increasingly necessary to analyze surfaces with non-embedded ends of more complex shapes in order to clarify the properties of n-noids, minimal surfaces with only embedded ends. This research also aims to potentially lead to future research on general complete minimal surfaces of finite total curvature.