Geometric Models for Secondary Structures in Proteins

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ABSTRACT

This reports represents a study of beta barrels as a secondary structure in proteins, using methods from differential geometry and variational calculus, namely Dirichlet and Willmore-type energies. We review some historical models of beta sheets and barrels based on best-fitting hyperboloids and catenoids, respectively, and explain why those models are outdated. We provide an elastic membrane model for these structures, via a Willmore type energy that is similar to the Helfrich energy for lipid bilayers.

References

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