



# GEOMETRY OF THE OVOIDS: AVIAN EGGS AND SIMILAR ASYMMETRIC FORMS

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Despite the longstanding interest in the shapes of the eggs the available parametric descriptions in the modern literature are given only via purely empirical formulas without any clear relationships with their measurable parameters.

Here we present geometrical models of the eggs based on Perseus spirics and Cassinian ovals which were known since the ancient time but their analytical parameterization was also absent in the meantime. Such ones have been found recently and the present work is based on the idea to use spirics or Cassinians as geometrical models of the eggs shapes.

New explicit formulas for the volumes, surface areas and the curvatures of the avian eggs have been derived from the first principles and these have been compared with the available experimental data.

MSC: 17B81, 22E15, 22E46, 22E70, 81R05

Keywords: Cassinian oval, curvature, curve, geometrical model, Jacobian elliptic functions, parameterization, Perseus spirics, Preston model, uniformization

## Contents

<b>1</b>	<b>Introduction</b>	<b>67</b>
<b>2</b>	<b>Parameterizations</b>	<b>68</b>
<b>3</b>	<b>New Egg’s Model</b>	<b>71</b>
<b>4</b>	<b>Eggshell Geometry</b>	<b>72</b>
<b>5</b>	<b>Surface Area</b>	<b>73</b>
<b>6</b>	<b>Cartesian Parameterization</b>	<b>75</b>
<b>7</b>	<b>Volume</b>	<b>77</b>
<b>8</b>	<b>Preston’s Models and Comparisons</b>	<b>78</b>
	8.1 Volumes . . . . .	79
	8.2 Surface Areas . . . . .	80
	8.3 Curvatures . . . . .	81
<b>9</b>	<b>Complimentary Comparisons, Comments and Conclusions</b>	<b>82</b>
	<b>References</b>	<b>90</b>