

# The Kathie polynomial in $xy$ for describing an arbitrarily complex, but regular surface

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**Abstract.** A  $z$ -datum is associated with each member of a set of contiguous  $xy$ -pairs. Using these data a mathematical function is generated by extending the polynomial interpolation procedure of Lagrange. The function is called the Kathie polynomial in  $xy$  and can be used in turn to describe an arbitrarily complex, but regular surface. The Kathie polynomial in  $xy$  is one function that is real and conceptually simple. Because of this it can be analysed by applying conventional integration and differentiation techniques. Evidence suggests that the problem of oscillations associated with high degree polynomials can be ameliorated. The Kathie polynomial in  $xy$  is generated for a relatively large matrix within which the matrix of relevant  $xy$ -pairs and associated  $z$ -data is embedded. A case study featuring the surface of Uluru is described.