On a family of holomorphic correspondences

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Holomorphic correspondences are polynomial relations $P(z, w) = 0$, which can be regarded as multi-valued self-maps of the Riemann sphere (implicit maps sending $z tow$). The iteration of such multivalued map generates a dynamical system on the Riemann sphere (dynamical system which generalise rational maps and finitely generated Kleinian groups). We consider a specific $1-(complex)$parameter family of $(2 \div 2)$ correspondences F_a (introduced by S. Bullett and C. Penrose in 1994), which we describe dynamically. In particular, we show that for every a in the connectedness locus M_Γ, this family is a mating between the modular group and rational maps in the family $Per_1(1)$; we develop for this family a complete dynamical theory which parallels the Douady-Hubbard theory of quadratic polynomials; and we show that M_Γ is homeomorphic to the parabolic Mandelbrot set M_1.

This is joint work with S. Bullett.