Cubic Thue equations with automorphisms

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Let $F(X, Y)$ be an irreducible cubic form with integer coefficients, positive discriminant and non-trivial automorphisms. We show that the Thue equation $F(x, y) = 1$ has at most three integer solutions except a few known cases. This was proved by R. Okazaki before, and we give another proof. For the proof, we use an explicitly expressed cubic form which is equivalent to F. To obtain an upper bound for the size of solutions, we use the Padé approximation method. To obtain a lower bound for the size of solutions, we use a result of Okazaki on gaps between solutions.