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Title: A study on the exponential Diophantine equation $a^x + (a + b)^y = b^z$

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For any given pair (a, b) of relatively prime integers greater than 1, we study the Diophantine equation in the title. First, we propose a conjecture to describe the positive integer solutions x, y, z of the equation. Second, we confirm our conjecture for certain pairs (a, b) .

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