Systems of additive equations over p-adic field

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Abstract. Consider the system of additive equations

$$a_1 x_1^k + \cdots + a_s x_s^k = 0$$
$$b_1 x_1^n + \cdots + b_s x_s^n = 0,$$

where k and n are distinct positive integers and all the coefficients are integers. We present bounds on s, in terms of k and n, which guarantee that this system has a nontrivial p-adic integral solution for each prime p, regardless of the values of the coefficients.