Two conjectures in number theory

Dao Thanh Oai

August 1, 2015

Abstract

In this note, I propose a conjecture of generalization of the Fermat Last Theorem and a conjecture of generalization of the Beal's conjecture.

Conjecture 1. *Let k, n, m be three positive integers such that $k \geq m+n$ and $m \neq n$, then no (n+m) positive integers x_1, x_2, x_n, y_1, y_2,..., y_m can satisfy a equation as follows:*

$$x_1^k + x_2^k + ... + x_n^k = y_1^k + y_2^k + ... + y_m^k \tag{1}$$

Conjecture 2. *Let n, m be two positive integers such that $m \neq n$. Let k_1, k_2,..., k_n, h_1, h_2,..., h_m be $(n+m)$ positive integers, such that $k_i \geq n+m$ for $i = 1, 2, ..., n$ and $h_j \geq n+m$ for $j = 1, 2, ..., m$. Let x_1, x_2,..., x_n, y_1, y_2,..., y_m be $(n+m)$ positive integers satisfy a equation as follows:*

$$x_1^{k_1} + x_2^{k_2} + ... + x_n^{k_n} = y_1^{h_1} + y_2^{h_2} + ... + y_m^{h_m} \tag{2}$$

Then x_1, x_2,...x_n, y_1, y_2,..., y_m have a common prime factor.

References

[1] L. J. Lander, T. R. Parkin, J. L. Selfridge; Parkin; Selfridge (1967). *A Survey of Equal Sums of Like Powers*. Mathematics of Computation 21 (99): 446459. doi:10.1090/S0025-5718-1967-0222008-0.

[2] Frits Beukers (January 20, 2006). *The generalized Fermat equation*. Staff.science.uu.nl. Retrieved 2014-03-06, available at

http://www.staff.science.uu.nl/ beuke106/Fermatlectures.pdf

Dao Thanh Oai: *Cao Mai Doai-Quang Trung-Kien Xuong-Thai Binh-Viet Nam*
E-mail address: *daothanhoai@hotmail.com*