

Patent Owner Caltech's Oral Argument April 19, 2018

Apple, Inc. v. California Institute of Technology.
Case No. IPR2017-00297

Instituted Grounds

IPR2017-00423*: Patent No. 7,916,781

Ground	Claims	Basis	Prior Art
1	13-15, 18, 22	103	Ping and MacKay
2	16	103	Ping, MacKay, Coombes

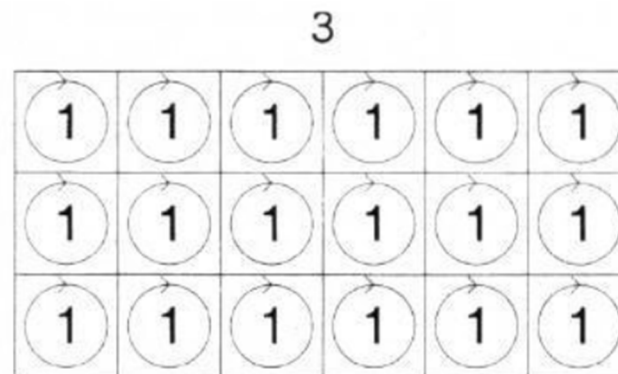
*Consolidated with IPR2017-00297

IPR2017-00297: Patent No. 7,916,781

Ground	Claims	Basis	Prior Art
2	19-21	102	Ping

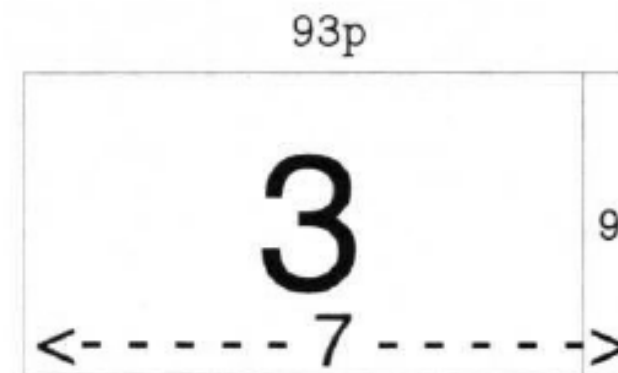
MacKay's regular and irregular codes

- ▶ Regular codes: “[V]ery sparse random parity check matrices with uniform weight t per column and t_r per row.” EX1002, p. 1449.



EX1002, p. 1450

- ▶ Irregular codes: “[P]arity check matrices [that] have nonuniform weight per column.” *Id.*



EX1002, p. 1450

Pet.'s rationale lacks logical underpinnings

“[A]fter comparing **‘regular’ Gallager codes (like those of Ping)** against ‘irregular Gallager codes’, MacKay concludes that making an LDPC code irregular improves performance.”

423 Pet. 34

- ▶ Ping’s parity-check matrix has nonuniform column weights, and so is not a regular Gallager code.

$$H = \left(\begin{array}{ccc|ccc} 1 & & & & & 0 \\ 1 & 1 & & & & \\ & \ddots & \ddots & & & \\ 0 & & & 1 & 1 & \\ \hline & \underbrace{\hspace{2cm}}_{(n-k-1)} & \underbrace{\hspace{1cm}}_{(1)} & & & \underbrace{\hspace{2cm}}_{(k)} \end{array} \right) \begin{array}{l} \\ \\ \\ \\ \\ H^d \end{array}$$

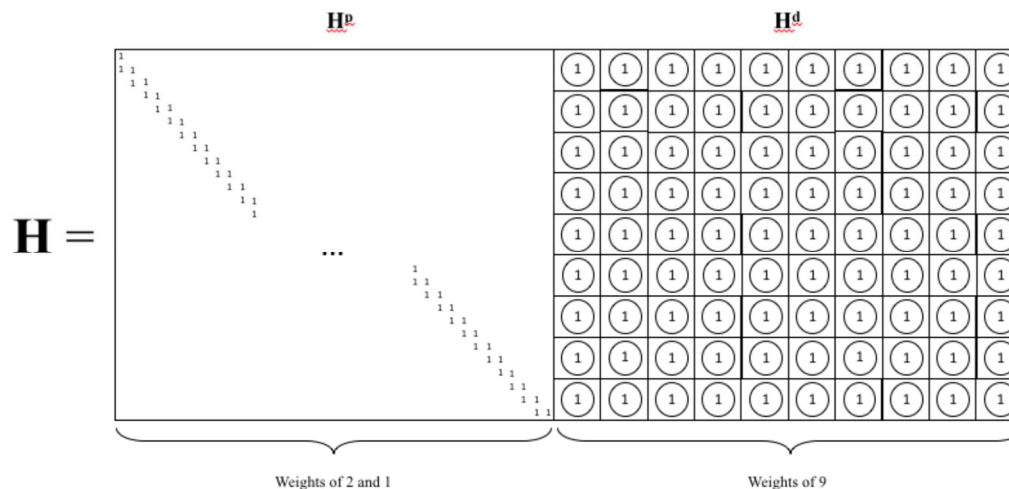
Weight 2 Weight 1 Weight 4

423 POPR 12

11	Q. So, in other words, <u>Ping's parity check</u>
12	<u>matrix H</u> has nonuniform column weight; correct?
13	A. It <u>has different weights for the</u>
14	<u>columns.</u>

EX 2033 (Davis Dep.) 231:11-14

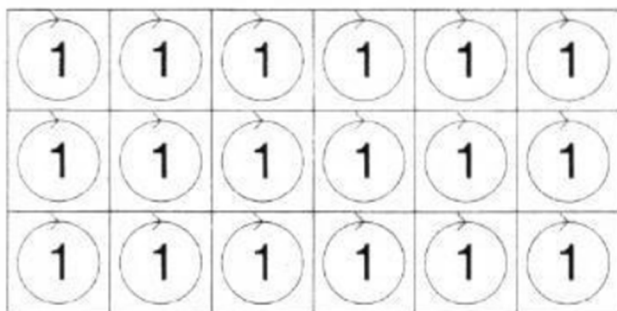
Ping's parity-check matrix is nonuniform



Ping's parity-check matrix; MM ¶84

3

93p



MacKay's regular code; EX1002, p. 1450



MacKay's irregular code; EX1002, p. 1450

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