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## QUATERNARY BOUNTIES

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WANTED: DEAD OR ALIVE

(.0122, 1 <sup>20</sup> , 12)	(.0123, 1 <sup>20</sup> , 12)	(.1023, 2 <sup>1420</sup> , 11)	(.1032, 2 <sup>1420</sup> , 12)
(.1033, 1 <sup>20</sup> , 11)	(.1231, 2 <sup>1420</sup> , 8)	(.1232, 2 <sup>1420</sup> , 9)	(.1233, 2 <sup>1420</sup> , 9)
(.1321, 2 <sup>1420</sup> , 9)	(.1323, 2 <sup>1420</sup> , 10)	(.1331, 1 <sup>20</sup> , 8)	(.2012, 1 <sup>20</sup> , 5)
(.2112, 1 <sup>20</sup> , 5)	(.3101, 1 <sup>20</sup> , 4)	(.3102, 0 <sup>20</sup> , 5)	(.3103, 1 <sup>20</sup> , 4)
(.3112, 2 <sup>1420</sup> , 7)	(.3122, 2 <sup>1420</sup> , 4)	(.3123, 1 <sup>31</sup> , 6)	(.3131, 2 <sup>1420</sup> , 6)
(.3312, 2 <sup>1420</sup> , 5)			

FIGURE 1. The twenty-one wild four-digit quaternary games (with first wild genus value & corresponding heap size)

## REWARD: \$25 per game

To collect a reward, you must exhibit the game's misere indistinguishability quotient semigroup<sup>1</sup>

$$Q = \mathcal{F}_H / \rho$$

including

- (1) Faithful semigroup presentation of  $Q$ .
- (2) Pretending function  $\Phi : H \rightarrow Q$ .
- (3) Quotient partition  $Q = N \cup P$ .

Assemble your posse! Send solutions to the sheriff, who will pay all bounties:

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<sup>1</sup>See [TTW].

## REFERENCES

- [Gril] P. A. Grillet, *Commutative Semigroups*. Kluwer Academic Publishers, 2001. ISBN 0-7923-7067-8.
- [TTW] Thane E. Plambeck, "Taming the Wild in Impartial Combinatorial Games"  
<http://arxiv.org/abs/math.CO/0501315>

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