Computationally Hard Problems

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Hand-in for week: 7

Exercise 1

Show the computation of $[\frac{1543}{799}]$ using the rules shown in the lecture notes. You may use that gcd(1543, 799) = 1.

1. $[\frac{1543}{799}] = [\frac{744}{799}]$ by I-2
2. $= [\frac{2}{799}]$, $[\frac{372}{799}]$ by I-1
3. $= [\frac{2}{799}]$, $[\frac{186}{799}]$ by I-1
4. $= (+1)[\frac{186}{799}]$ by I-5 $(799 \equiv 7 mod 8)$
5. $= (+1)[\frac{55}{799}]$ by I-2
6. $= (+1)(-1)[\frac{799}{55}]$ by I-3
7. $= [\frac{29}{55}]$ by I-2
8. $= (-1)[\frac{55}{29}]$ by I-3
9. $= (-1)[\frac{26}{29}]$ by I-2
10. $= (-1)[\frac{2}{29}]$, $[\frac{13}{29}]$ by I-1
11. $= (-1)(-1)[\frac{29}{13}]$ by I-3
12. $= (-1)(-1)[\frac{3}{13}]$ by I-2
13. $= (-1)(-1)(-1)[\frac{13}{3}]$ by I-3
14. $= (-1)(-1)(-1)[\frac{1}{3}]$ by I-2
15. $= (-1)^2(-1)(+1)$
16. $= (-1)^2$
17. $= 1$