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Complexity of Unshuffling a Square for Small Alphabets

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Let `Square` be the language of strings w such that there exists an x so that *Shuffle*(x, x, w), i.e., the strings w for which we can find an x and a shuffle of x with itself that yields w. Buss and Soltys [1] showed that `Square` is NP-hard when the underlying alphabet has at least 7 symbols; we know that it is trivially in polytime when the underlying alphabet is unary. The question is, what is $i, 1 <= i < 7$, such that `Square` over an alphabet of size i is polytime, and `Square` over an alphabet of size $i + 1$ is not (and if it is not, presumably it is NP-hard). For more details see [1].

References

[1] Sam Buss and Michael Soltys. Unshuffling a Square is NP-Hard. Journal of Computer and System Sciences 80(4):766–776 2013