Skipjack's F-Table and S-Box Fun

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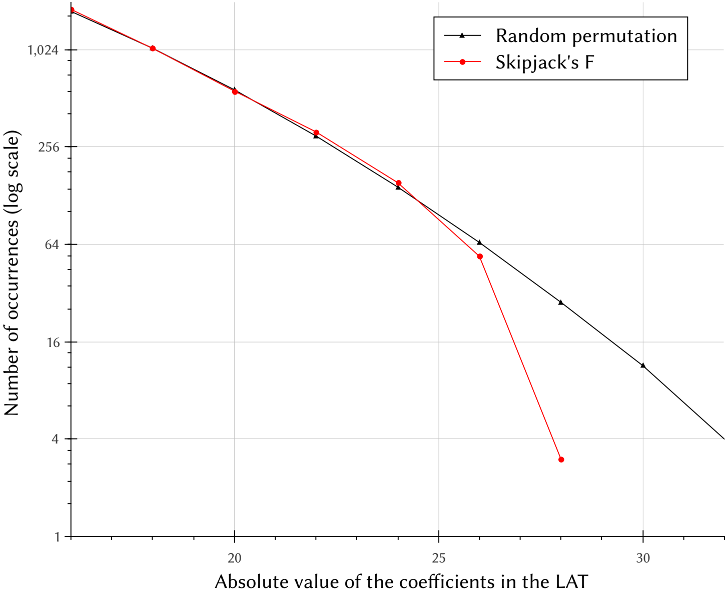
FSE 2015 Rump Session

Skipjack's F Is Not Good...

		Skipjack	Random	AES
Diff. Spec.	0	38849	39252	32640
	2	20559	19962	32130
	4	4855	4875	255
	6	686	827	0
	8	69	99	0
	10	5	9	0
	12	2	1	0
$\max_{a,b\geq 1}\{\ell_{a,b}\}$		28	32	16

But Skipjack's F Doesn't Look Random Either!



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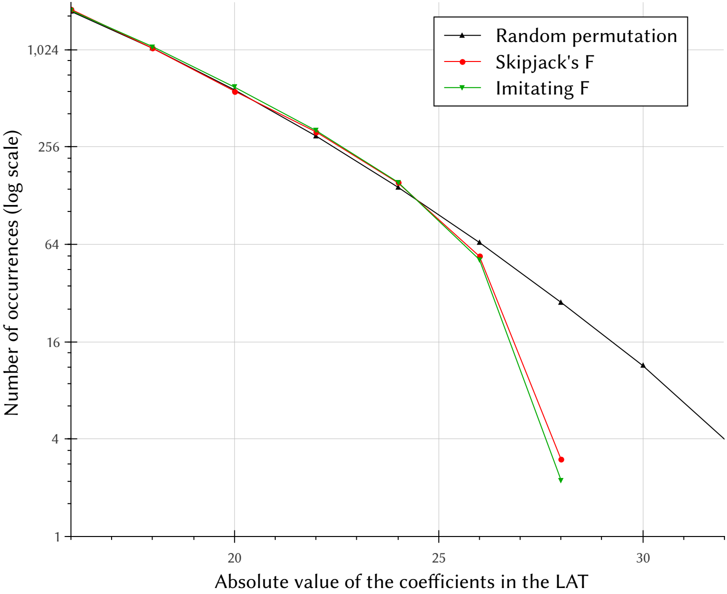
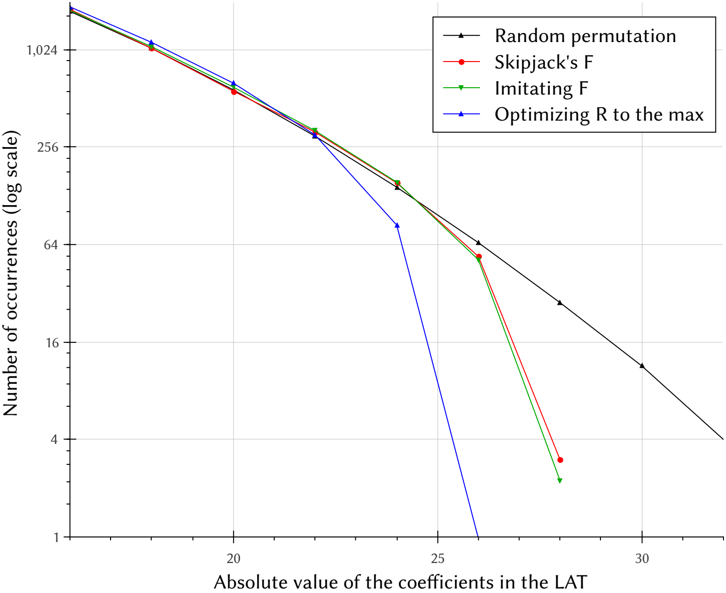
- Let us optimize for this quantity:

$$R = \sum_{(a,b) \in [1,255]^2} 2^{|\ell_{a,b}|}$$

The Imitation Game



The Optimization Game



Pictures for S-Box Analysis

And now for something...

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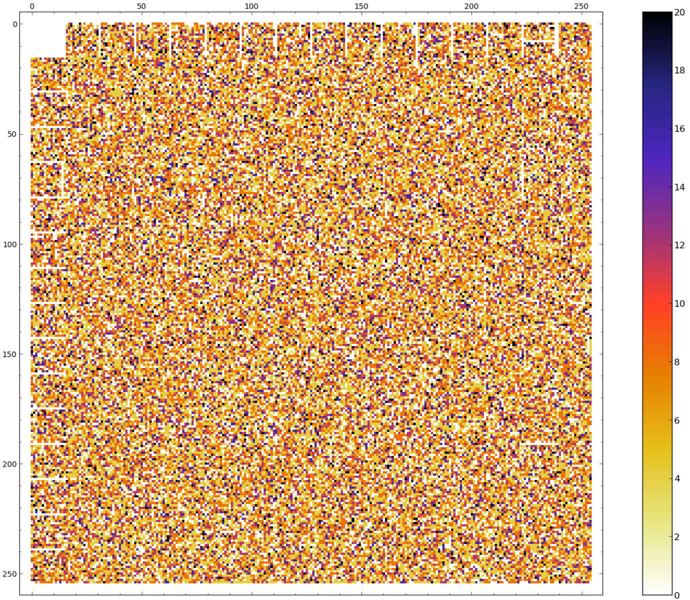
Modern Art to the cryptographer's rescue!

CLEFIA's S_0's LAT, JP style



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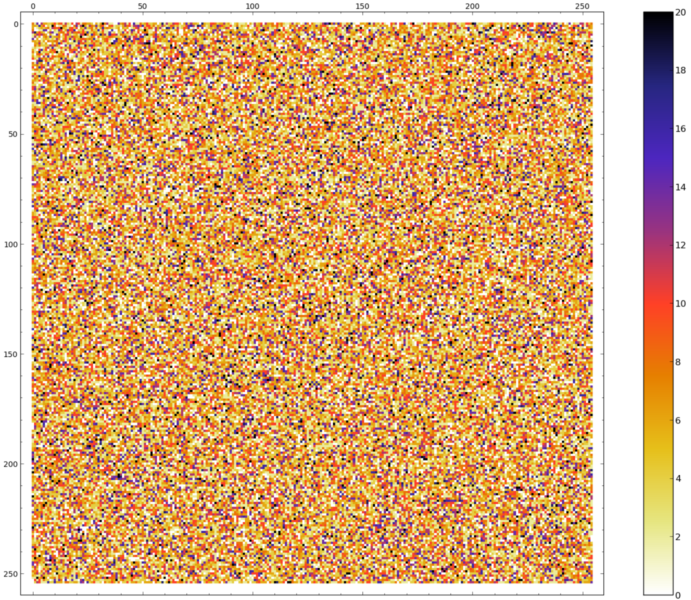
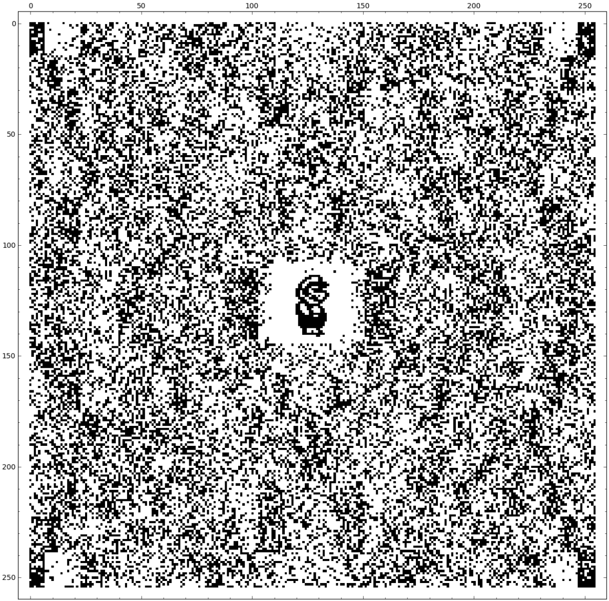
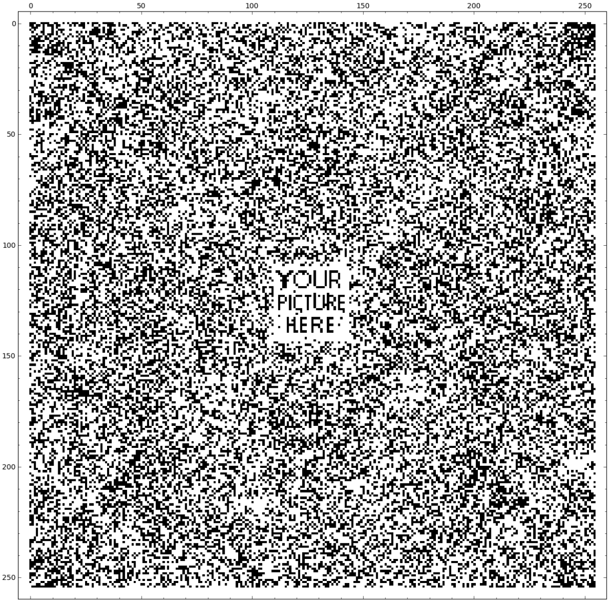


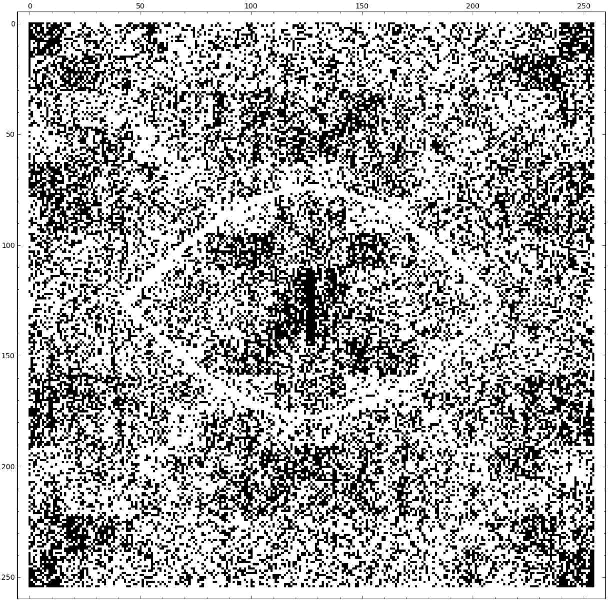
From a Picture to a S-Box



Embedding Your Own Picture in a DDT



A Possible Replacement for Skipjack's F-Table



Conclusion