Rethinking IDEA

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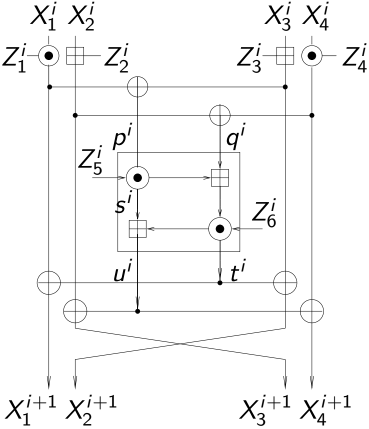
Joint work with Eli Biham, Nathan Keller, and Adi Shamir

IDEA

- 64-bit block, 128-bit key block cipher
- Presented by Lai and Massey in 1991
- Widely used in many applications
- Has 8.5 rounds
- A “red cape” for cryptanalysts — more than 20 research papers.



Previous Results on IDEA

Rounds	Attack Type	Data	Time	Source
2	Differential	2^{10} CP	2^{40}	[M93]
2.5	Differential	2^{10} CP	$2^{104.7}$	[M93]
3	Differential-Linear	2^{29} CP	2^{44}	[BKR97]
3.5	Differential	2^{56} CP	2^{67}	[BKR97]
3.5	Linear	103 KP	2^{97}	[J05]
4	Impossible Differential	$2^{36.6}$ CP	$2^{66.6}$	[BBS99]
4	Linear	114 KP	2^{114}	[NPV04]
4.5	Impossible Differential	2^{64} KP	$2^{110.4}$	[BBS99]
5	Demirci-Selçuk-Türe	2^{24} CP	2^{126}	[DST03]
5	Demirci-Selçuk-Türe	$2^{24.6}$ CP	2^{124}	[AS06]
5.5	Key-dependent Linear	2^{21} CP	$2^{112.1}$	[SL09]
6	Key-dependent Linear	2^{49} CP	$2^{112.1}$	[SL09]

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4.5	Meet-in-the-Middle	2 KP	2^{103}	**New!**

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4.5	Meet-in-the-Middle	2 KP	2^{103}	**New!**
6	Meet-in-the-Middle BD-relation	2 KP	$2^{123.4}$	**New!**
6	Meet-in-the-Middle BD-relation	16 KP	$2^{111.8}$	**New!**

Questions?

Available online at
http://eprint.iacr.org/2011/417

Thank you for you attention!