Equivalent Key Recovery Attacks against HMAC and NMAC with Whirlpool Reduced to 7 Rounds

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another work from ASK 2013

HMAC-Whirlpool

- HMAC: $H(K\oplus opad \| H(K\oplus ipad \| M))$, designed by Mihir Bellare, Ran Canetti and Hugo Krawczyk in Crypto 1996; standarized by ANSI, IETF, ISO, NIST from 1997.

- Whirlpool: 512-bit hash function designed by Barreto and Rijmen in 2000, standarized by ISO/IEC, follows Miyaguchi-Preneel mode, i.e., $f(h, M) = E_h(M)\oplus h\oplus M$, with AES-Like compression function.

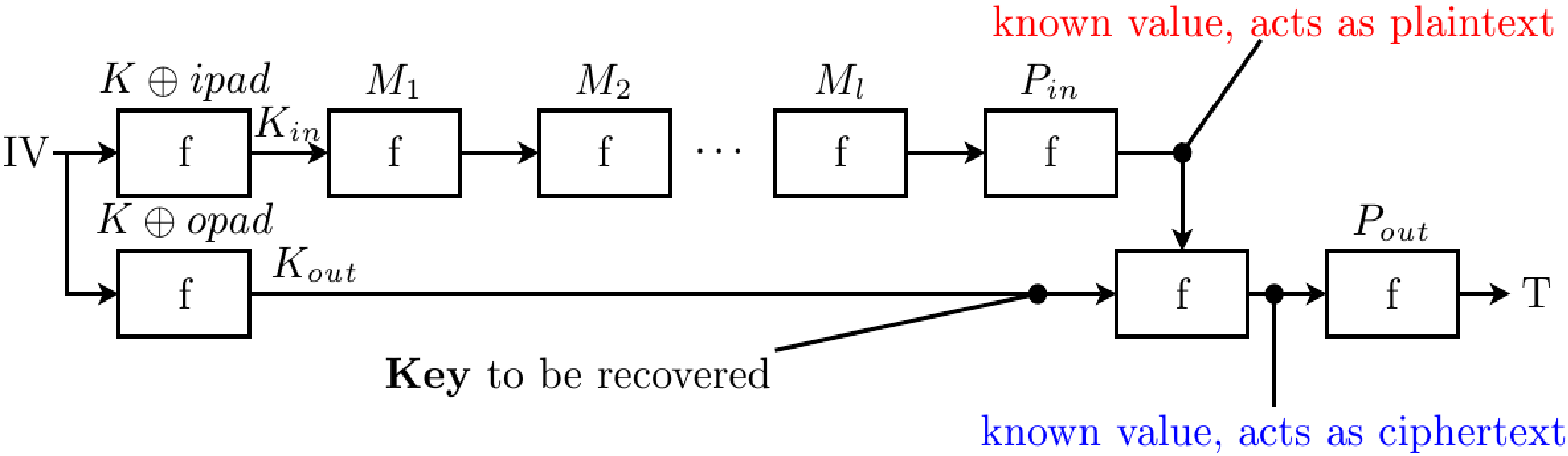
The Best Attack

- Yet to be presented, by Guo-Sasaki-Wang-Wu at Asiacrypt 2013, works for Whirlpool reduced to 6 out of 10 rounds

- Equivalent with chosen plaintext attack on the underlying AES-like block cipher

How it worked ?

Filter plaintext for structured collisions



New Attack

Convert most recent chosen plaintext attacks on reduced AES to known plaintext attack.

+ Combine with the attack framework by Guo et al.

=> Equivalent keys (including K_{in} and K_{out}) Attack for HMAC-Whirlpool reduced to 7 rounds, **mor**e rounds than all existing collision/preimage attacks against Whirlpool.