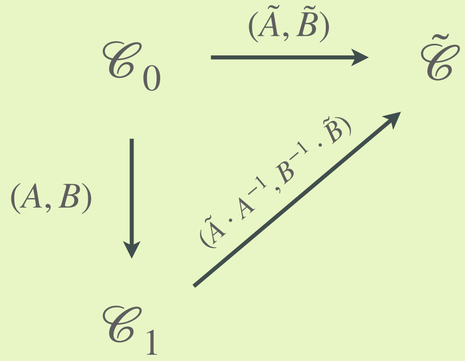
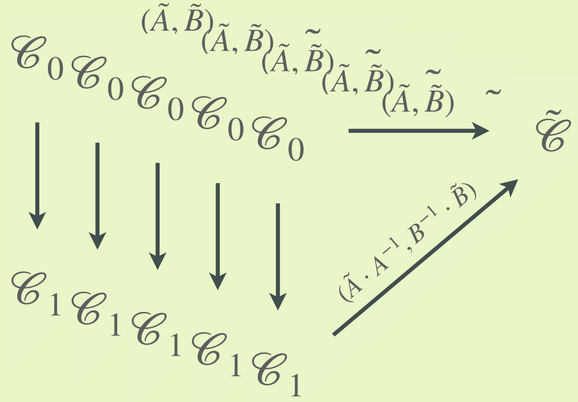
From MCE to MEDS

naive approach

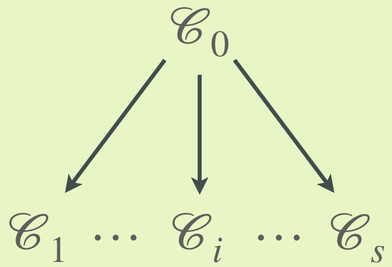


repeat t times



1 [1]

multiple pk



provide s public keys, $b \in \{0, \ldots, s\}$
response is isometry $\mathscr{C}_b \to \tilde{\mathscr{C}}$

2 [2]

fix weight

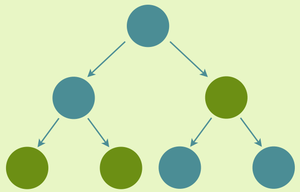
- generate $\mathscr{C}_0 \to \tilde{\mathscr{C}}$ from seed
- respond to $b = 0$ with seed
- response much cheaper!

adjust probability so that $b = 0$ appears more

3 [2]

seed tree

instead of sending t seeds, send tree



to reveal nodes $N_1, \ldots, N_{w'}$ communicate $N_1 \ldots, N_w$ and for the $t - w$ remaining nodes only appropriate parent nodes

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[1] L. De Feo and S. D. Galbraith. SeaSign: Compact isogeny signatures from class group actions. EUROCRYPT 2019.
[2] W. Beullens, S, Katsumata, and F. Pintore. Calamari and Falafl: Logarithmic (linkable) ring signatures from isogenies and lattices. ASIACRYPT 2020.
[3] J. Ding, M-S Chen, A. Petzoldt, D. Schmidt, B-Y. Yang, M. Kannwischer, and J. Patarin. Rainbow. NIST 2020.
[4] W. Beullens, M-S. Chen, S-H. Hung, M. Kannwischer, B. Peng, C-J. Shih, and B-Y. Yang. Oil and Vinegar: Modern parameters and implementations.

2

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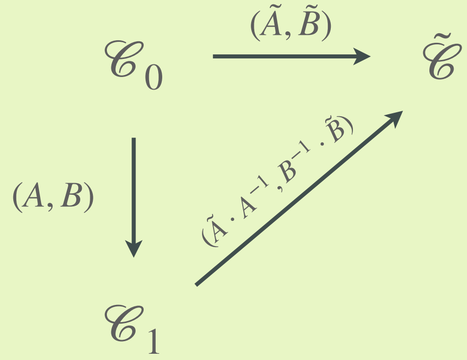
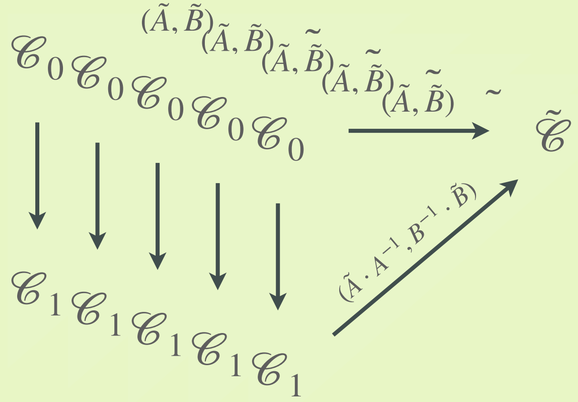


repeat t times



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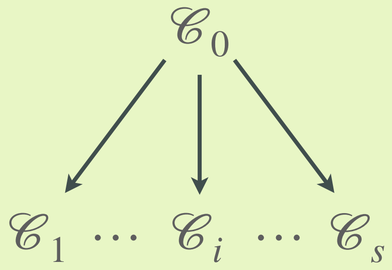

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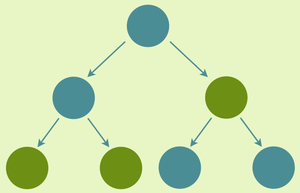

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4 [3,4]

compression

instead of generating A_i, B_i from seed and computing $\mathscr{C}_i = A_i \cdot \mathscr{C}_0 \cdot B_i$

generate part of $\mathscr{C}_i$ from seed.
compute appropriate A_i, B_i
and rest of $\mathscr{C}_i$

Hint: this does not break MCE!

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[1] L. De Feo and S. D. Galbraith. SeaSign: Compact isogeny signatures from class group actions. EUROCRYPT 2019.
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