

CFOP 分阶段学习教程

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注意：开始之前请先学会层先法

步骤介绍

CFOP 法共分四步：

- (1) 在底层架好十字(CROSS)
- (2) 完成前两层(F2L)
- (3) 顶面颜色统一(OLL)
- (4) 完成顶层(PLL)



字母介绍

F,B,L,R,U,D 分别代表魔方的前,后,左,右,上,下六个面(与颜色无关, 只表示位置)

即：英文的 Front, Back, Left, Right, Up, Down。

拧法介绍

一个字母代表顺时针转 90 度，字母加 “'” 表示逆时针转 90 度，加 “2” 表示转 180 度

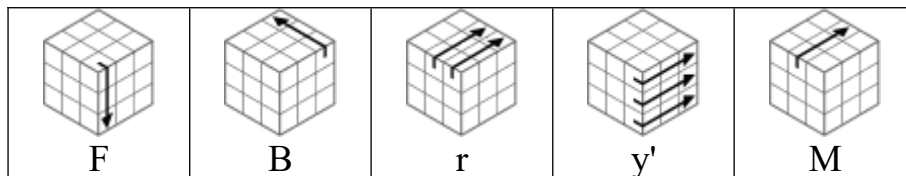
单层转：F、B、L、R、U、D，F'、B'、L'、R'、U'、D'，F2、B2、L2、R2、U2、D2

两层转(单层转的同时中间层一起转)：f、b、l、r、u、d，f'、b'、l'、r'、u'、d'，f2、b2、l2、r2、u2、d2

整体转(三层转)：x、y、z，x'、y'、z'，x2、y2、z2 【方向对应为 x-R，y-U，z-F】

转中层：M、M'、M2 (M 的方向同 R)

图示：



注：顺、逆指面对该面看时的转向，故对于 B、B'、L、L'、D、D' 的转向要特别小心。

基本公式有 $41+57+21=119$ 个，刚开始学的朋友不可能一次学完，可以按照一定的步骤分阶段学习。

第一阶段 CROSS+3+(1+2)+(2+2)

CROSS 首先掌握基本的做出 CROSS 的方法

4 个棱块复位后是这样的

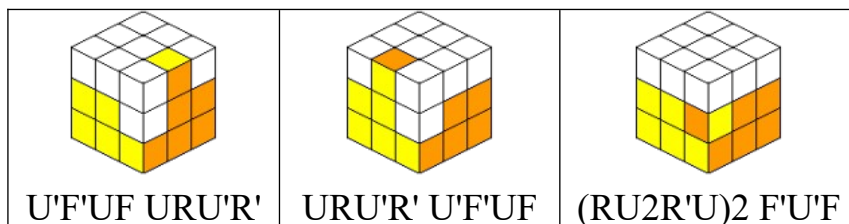


不要是这样



然后 在此基础上完成第一层(还差 4 个角)

F2L 先掌握三个公式

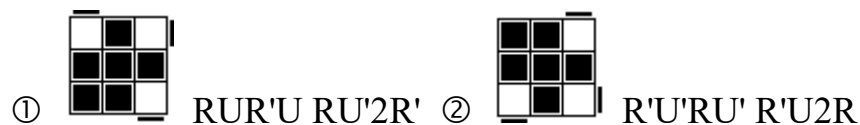


OLL 分两步做(顶面出 “+”字, 顶面颜色统一)

OLL-1 只背 1 个公式 $F R U R' U' F'$



OLL-2 先背 2 个公式(总共处理 7 种情况)

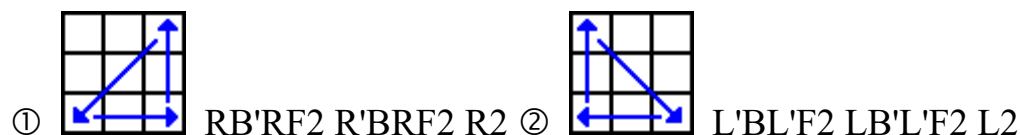


遇到其他 5 种情况时 先用 $R U R' U R U' 2 R'$



PLL 分两步(角块归位, 棱块归位)

PLL-1 2 个公式(总共处理 3 种情况)



PLL-2 2 个公式(总共处理 4 种情况)

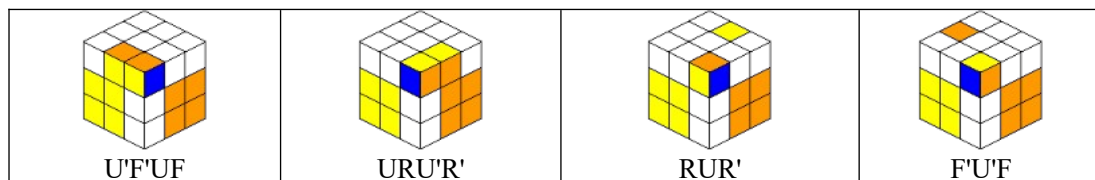


第一阶段的公式足以还原魔方

第二阶段 CROSS+(3+?)+(3+7)+(3+4)

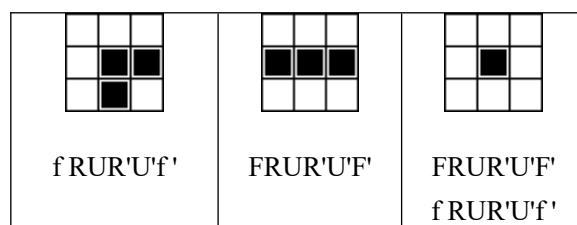
CROSS 不多作要求，快速完成第一层

F2L 在第一阶段的基础上，逐步理解 F2L，掌握几种基本的情况

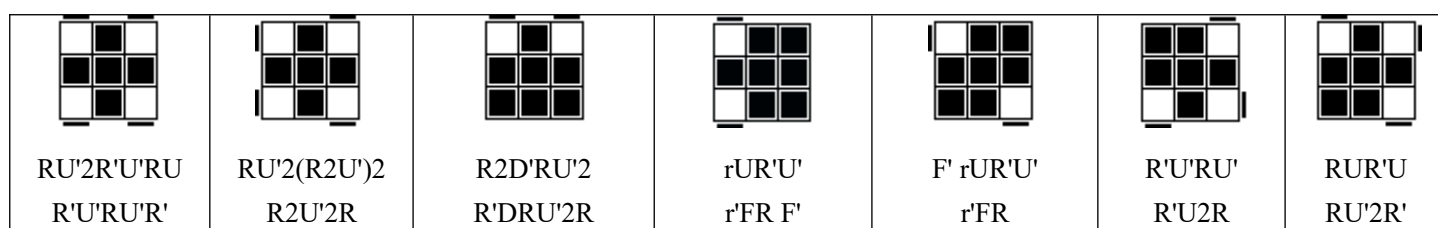


OLL 仍然分两步做(顶面出“+”字，顶面颜色统一)

OLL-1 3 个公式

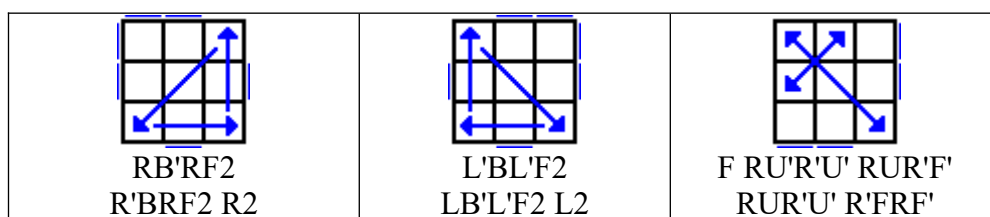


OLL-2 7 个公式

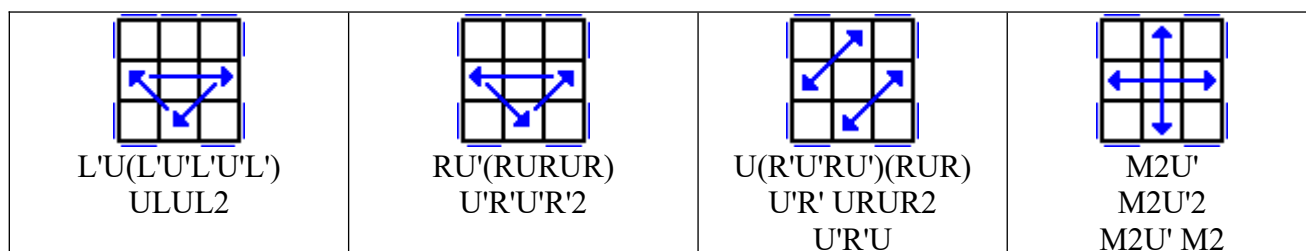


PLL 仍然分两步(角块归位,棱块归位)

PLL-1 3 个公式(多加的公式是这个阶段**必须掌握**的!)



PLL-2 4 个公式(多加的公式是这个阶段**必须掌握**的!)



第三阶段 完成 PLL、OLL、F2L、CROSS

PLL 和 OLL 公式，“投资少”，见效快，是初期提速最简便最快捷的方法。

PLL 和 OLL 的学习过程中可以加入手法了(这里的手法指的是像 x y z 的转法和一次转两层，并且注意 U2 和 U'2 作为手法上的不同)。

学习新的手法的时候，不要靠死记硬背，现在应该转为肌肉记忆，就是说通过不断地转某一公式，最终达到看到这种情况就会用手转而不是在大脑里反映出公式再去转(转完后都不知道用的公式是什么)。

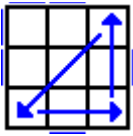
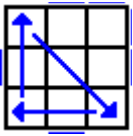
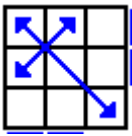
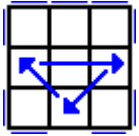
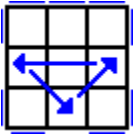
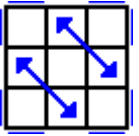
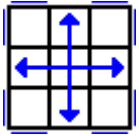
学习建议：每天都背，不要贪多，肌肉记忆，注意合理分组。

给出分组学习顺序指导：

PLL

21 个公式(分为 5 大组)

1. 已经掌握的 7 个公式

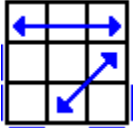
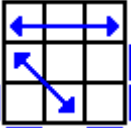
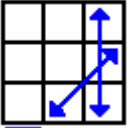
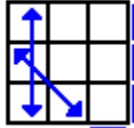
A:b  x' RU'RD2 R'URD2 R'2	A:a  x' L'UL'D2 LU'L'D2 L2	Y  F RU'R'U' RUR'F' RUR'U' R'FRF'	
U:b  L'U(L'U'L'U'L') ULUL2	U:a  RU'(RURUR) U'R'U'R'2	Z  U MU' M2U'M2U' MU2M2	H  M2U' M2U'2 M2U' M2

公式 Z：有最基本的换成给出的这个。M 左手无名指，M2 用右手无名指；U'用左手食指，U 用右手食指。M2 的转法参考 公式 H。

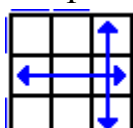
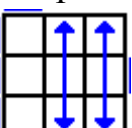
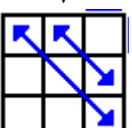
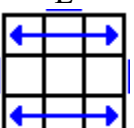
公式 H：所有的 M2 用右手无名指，U'用左手食指。转时 M2 先做 R'，无名指跟上来勾住 M 层(UB 棱)，然后做 R 的同时无名指做 M2

2.对称的两组

R:b	R:a	J:b	J:a
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 $R'U^2 \ RU^2$ $R'F \ RUR'U'$ $R'F'R^2U'$	 $LU^2 \ L'U^2$ $LF' \ L'U'LU$ LFL^2U	 $RUR'F' \ RUR'U'$ $R'FR^2U'R'U'$	 $L'U'LF \ L'U'LU$ $LF'L^2 \ ULU$
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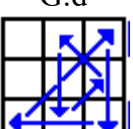
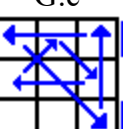
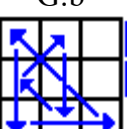
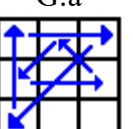
3.无对称组

 $RUR'U'R'F$ $R^2U'R'U' \ RUR'F'$	 $U'R'URU'R^2$ $F'U'FUR \ F \ x$ $R'U' \ R \ 1$	 $R'UR'U' \ yx^2$ $R'UR'U' \ R \ 1$ $U'R'URU$	 $x \ UR'U'LURU'r^2$ $U'RULU'R'U$
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公式 F：第二行的 U 用左手食指，(F x) 是同时完成的

公式 V：第一行的 (U' yx²) 是同时完成的

4.三角三棱换

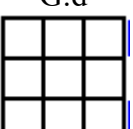
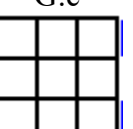
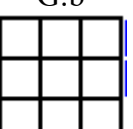
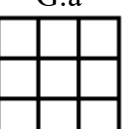
 $LdF' \ L^2u'$ $LU'L'UL'u \ L^2$	 $L^2u' \ LU'LUL'u$ $L^2 \ z' \ FL'F'$	 $R'd'F \ R^2u$ $R'URU'Ru' \ R^2$	 $R^2u \ R'UR'U'Ru'$ $R^2 \ z \ F'RF$
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新手不要回避这 4 个公式！这 4 个很简单的：

肌肉记忆是必须的，关键是学会如何区分这 4 种情况。观察这 4 种情况的时候，

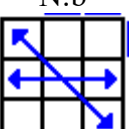
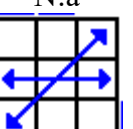
不要考虑内部的块是怎样移动的，而是要看已经正确的角棱(相连的短蓝线)和

需要移动的同色角块(相离的两条短蓝线)的相对位置，就是说把这四个情况简化为这样：

 $LdF' \ L^2u'$ $LU'L'UL'u \ L^2$	 $L^2u' \ LU'LUL'u$ $L^2 \ z' \ FL'F'$	 $R'd'F \ R^2u$ $R'URU'Ru' \ R^2$	 $R^2u \ R'UR'U'Ru'$ $R^2 \ z \ F'RF$
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其中，G:d 和 G:b 左右对称， G:c 和 G:a 左右对称。

5.两个转法很多的公式

 $R'URU' \ R'F'U'F$ $RUR'F \ R'F'RU'R$	 $LU'L'U \ LFUF'$ $L'U'LF' \ LFL'UL'$
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我换了很多最终选定使用这两个，不需要换手

OLL

57 个公式(分为 8 大组，按照分组的顺序学习)

1. 已经掌握的 10 个

45 F (RUR'U') F'	44 f (RUR'U') f'	2 F(RUR'U')F' f(RUR'U')f'
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23 R2D' RU'2 R'D RU'2R	21 RU'2 R'U'RUR'U' RU'R'	22 RU'2 R2U' R'2U' R2U'2R	24 rUR'U' r'FR F'	25 F' rUR'U' r'FR	26 R'U'RU' R'U'2R	27 RUR'U' RU'2R'
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2. 十字上只有一点的公式及 F(RUR'U')F' 的衍生公式

1 RU'2 R'2FRF' U2(R'FRF')	17 RUR'U' R'FRF'U2 R'FRF'	18 F(RUR'd) R'U2 R'FRF'	19 r'(RU)2 R'U'r R'2 FRF'	20 r'(RU)2 (R'U' r2R'2) (URU')r'
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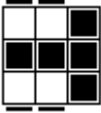
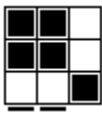
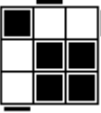
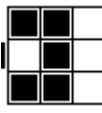
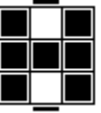
3 f(RUR'U')f' U' F(RUR'U')F'	4 f'(L'U'LU)f U F'(L'U'LU)F	12 FRUR'U'F' U FRUR'U'F'	11 F'L'U'LUF U' F'L'U'LUF	48 F (RUR'U')2 F'	47 F' (L'U'LU)2 F	51 f (RUR'U')2 f'
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43 f' (L'U'LU) f	40 R' (FRUR'U'F') UR	39 L (F'L'U'LUF) U'L'
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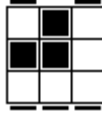
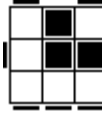
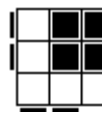
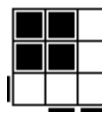
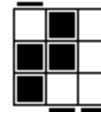
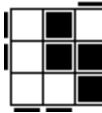
掌握基本的 10 个公式后，先学会十字上只有一点的公式可以大大提高还原效率，因为顶面做十字的时候，十字只有一点公式是最长的。

$F(RUR'U')F'$ 衍生公式那些不需要背新公式，很顺手的一个手法一拓展就会出现很多新公式。

3.几个比较简单的包含顺手手法的公式

 $RUR'U'$ $R'FRF'$	 $F(RU'R'U')$ $RUR'F'$	 RU^2R^2 FRF' RU^2R'	 $R'U'$ $R'FRF'$ UR	 $RUR'U'r$ $R'URU'r'$	 $rUR'U'$ $r'RU$ $RU'R'$
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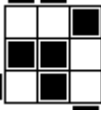
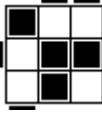
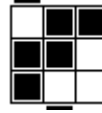
4.由 OLL-2 的 7 个基础公式演化出来的公式

 rU^2 $R'U'RUR'U'$ $RU'r'$	 $l'U^2$ $LUL'ULU$ $L'U\ 1$	 $r\ U^2$ $R'U'RU'\ r'$	 $l'U^2$ $LUL'U\ l'$	 $rUR'U'$ $RU^2\ r'$	 $l'U'LU'$ $L'U^2\ 1$
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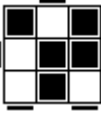
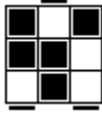
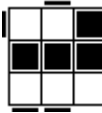
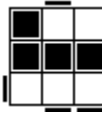
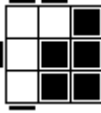
54、53 由 OLL22 演化而来

5、6、7、8 由 OLL26、27 演化

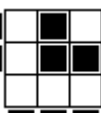
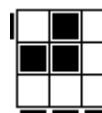
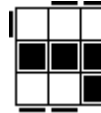
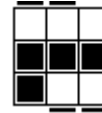
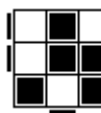
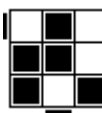
5.手法简单，最初几步相同的公式

 $RUR'U'$ $R'FRF'$ RU^2R'	 $L'U'LU'$ $LF'L'F$ $L'U^2L$	 $RUR'U'$ $RU'R'U'$ $R'FRF'$	 $L'U'LU'$ $L'ULU$ $LF'L'F$
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6.手法有点奇怪的公式

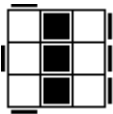
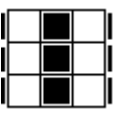
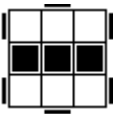
 $RU'R'U^2$ RU_yRU' $R'U'F'$	 $L'ULU^2$ $L'U_yL'U$ LUF	 rUr' $RUR'U'$ rUr'	 $l'\ U'\ 1$ $L'U'LU$ $l'\ U\ 1$	 $(RU)(B'U')$ $(R'U\ RBR')$	 $(L'U')(BU)$ $(LU'\ L'B'L)$
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7.

 $F'RU^2R'U^2$	 $FL'U^2LU^2$	 $R'FRUR'$	 $LF'L'U'L$	 $R'FRF'$	 $LF'L'F$
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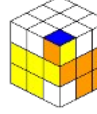
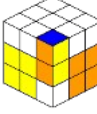
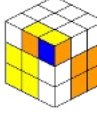
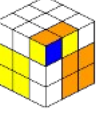
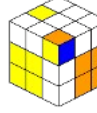
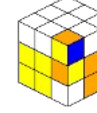
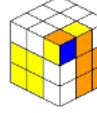
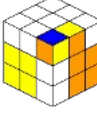
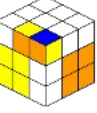
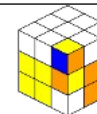
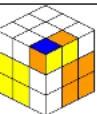
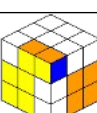
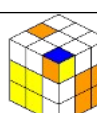
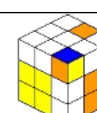
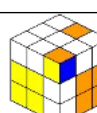
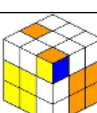
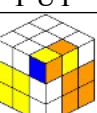
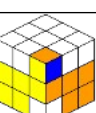
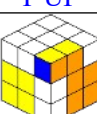
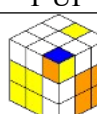
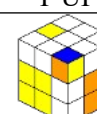
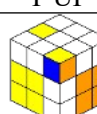
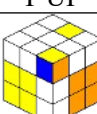
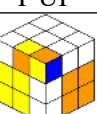
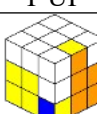
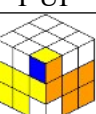
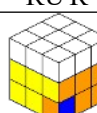
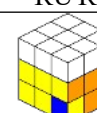
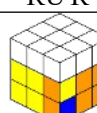
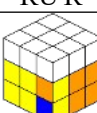
R'F2RF'	LF2L'F	F'R FU'F'	FL' F'UF	RU'2R'd' L'U'L	L'U2Ld RUR'
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8.剩余的十字上为长条的公式

34  R'U'RU y(rUR'U')M'	52  R'U'RU' R'd R'URB	55  R U'2R'2 U'RU'R'U2 FRF'	56  F(RUR'U') RF' rUR'U'r'
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F2L

41 个基本情况

 U'F'UF URU'R'	 URU'R' U'F'UF	 (RU2R'U')2 F'U'F	 (RUR'U')2 RUR'	 RU'R' F'U2F		 RBL U' L'B'R'	 F'L'B' U BLF
 RUR'	 U2RU'R'U' RUR'	 UF'U'FU' RUR'	 U'RU'R'U' RUR'	 RU'2R'U' RUR'	 RUR'U'2 RUR'U' RUR'	 U' RUR'U' RUR'	
 F'U'F	 U'2F'UFU F'U'F	 U'RUR'U F'U'F	 UF'UFU' F'U'F	 F'U2FU F'U'F	 F'U'FU2 F'U'FU F'U'F	 U F'U'FU F'U'F	
 U' F'UF	 U'F'U2FU' F'UF	 U2F'U'FU' F'UF	 UF'U2FU2 F'UF	 UF'U'FU2 F'UF	 (F'UFU')2U' F'UF	 F'UFU' F'UF	 U F'UFU'2 F'UF
 U RU'R'	 URU'2R'U' RU'R'	 U2RUR'U RU'R'	 U'RU'2R'U2 RU'R'	 U'RUR'U2 RU'R'	 (RU'R'U)2U RU'R'	 RU'R'U RU'R'	 U'RU' R'U2 RU'R'
	 RUR'U'2 RU'R'U RUR'	 F'U'FU2 F'UFU' F'U'F	 RUR'U' RU'R'U2 F'U'F	 F'U'FU F'UFU'2 RUR'			

CROSS 练习尽量少的步骤内(8步以内)完成

第四阶段 四向 F2L 和非标，双向 OLL，双向 PLL

四向：尽量在少转动魔方的情况下还原魔方。

公式可以参考 [张砷镓](#) 的 [教程](#)。

非标：非基本情况下的 F2L，利用未完成的空档来快速做 F2L。

公式参考 [中岛非标](#)。

本人公式手法风格为左右对称，这样可以减少记忆量，并可以锻炼双手。

本人能力有限，只能写到这个地方，更深入的技术还没有学习...

以上给出的全部公式为本人用的公式

2009 年 01 月 23 日

三叶虫

联系我：三叶虫，QQ 369421053 加我注明 魔方吧