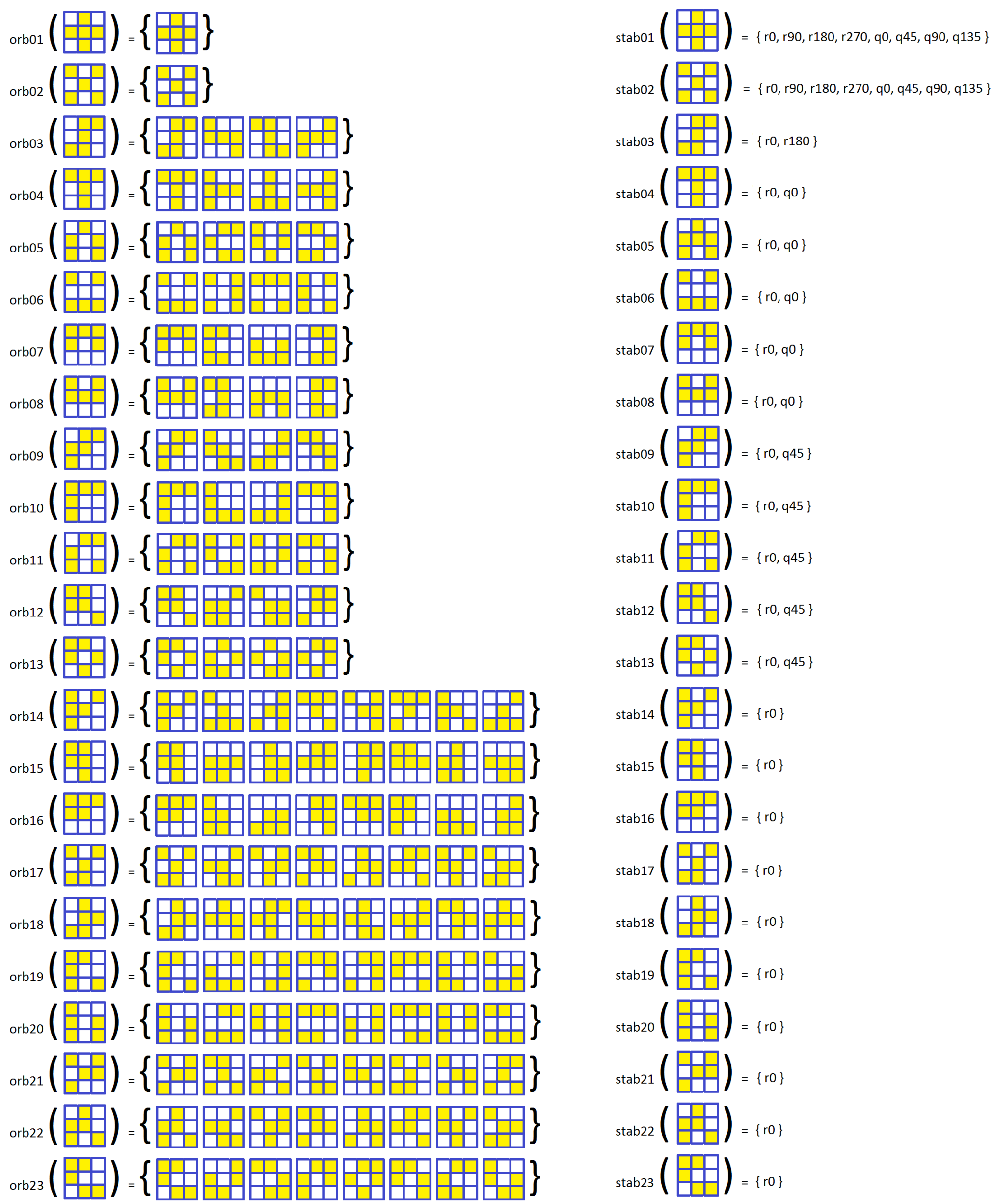
Noughts And Crosses, Orbits And Stabilizers by Adi Cox 16th September 2005

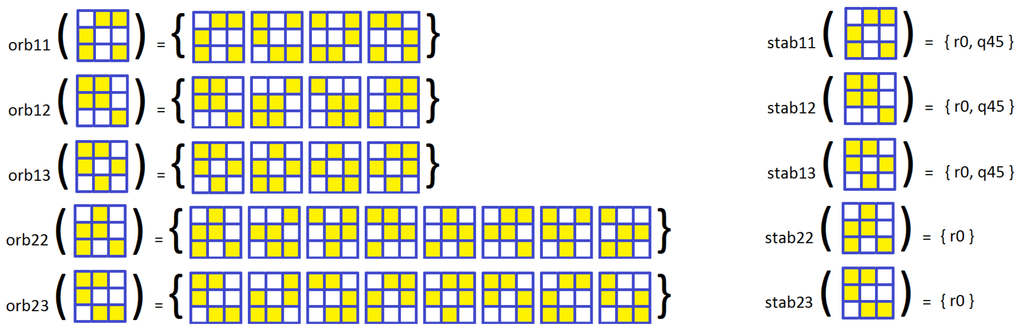
G = { r(0), r(pi/2), r(pi), r(3pi/2), q(0), q(pi/4), q(pi/2), q(3pi/4) } where q is thevertical line through the center.

Looking at noughts and crosses where crosses win, so there will be five crosses and four noughts in a 3 x 3 matrix. There will be 5 from 9 combinations:

(9!)/((9-5)!5!) = (9x8x7x6)/(4x3x2) = 2024/24 = 126



There are 24 possibilities out of 126 games where noughts and crosses draw. So we have 126 - 24 = 102 different ways for crosses to win a complete game.



The 24 possibiliies to draw above.

Looking at three dimentional noughts and crosses where crosses win, there will be fourteen crosses and thirteen noughts in a 3 x 3 x 3 cube. There will be 14 combinations from 27 the number of possible outcomes:

(27!)/((27 - 14)!14!) =(27x26x25x24x23x22x21x20x19x18x17x16x15)/(13x12x11x10x9x8x7x6x5x4x3x2)

= 20,058,300