Framework Combination

# 1 Combine Local Controller and Global Controller

For a dynamic system L, we have global invarant controller Ugc, and local Invariant Controller Ulc.

A question is how to combine them together.

Our method is combine the different controller following the same symmetry.

When a system L has a symmetry of G\_a, G\_a is applied also tow G\_gl

## The Simmetry of Global Oscilator.

Neural oscillator are couple with mechanical oscillator in the following manner.

\dot{x}=F(x,u1)

\dot{x\_c}=S(x\_c,u2);

u1=ho\*O(x\_c)

u2=hi\*I(x)

**Pose offset:**

When the original G\_off is apply to the x,

If we keep I(x) is the invariant of G\_off, then the Symmetry of the how system will be kept.

**Pose scalling group**

When G\_scal is applied to the x, if we hi=hi/scal.

Then the symmetry is kept.

**Time scalling**

If the scale factor is ts, we keep modify modify the original equation by \tao=tao\*ts.

hou=hou\*ts\*ts.

**Time offset**

This involves modify the state on the limit circle.

## 2 Motion Transition

When an character transform from one motion into another, character should in the state space (q,\dot{q})

For when motion is translated from motion ma to motion mb.

The state of (q,\dot{q} \in Boa(ma) \union Boa(mb)