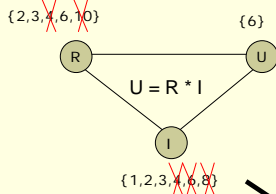


EUCLIDE is a Constraint Language based on Impervative DEfinition



Constraint Programming

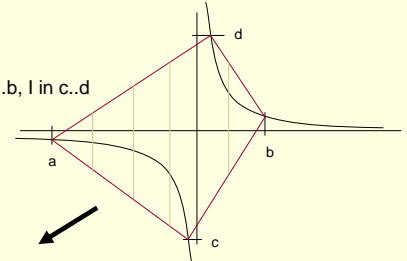
Exploit relations (constraints) to infer new informations on objects that represent unknowns (variables)



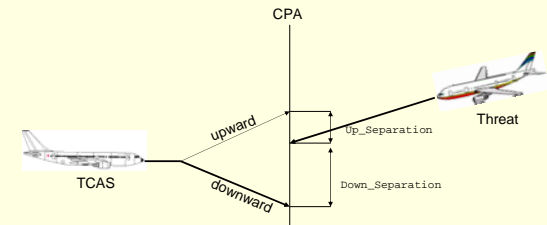
Abstractions

Over-approximate the computation of relations to benefit from powerful solving techniques (e.g. Linear Programming)

$$1 = R * I, \quad R \text{ in } a..b, I \text{ in } c..d$$



Automatic test data generation for critical C programs



Are properties P1a, P1b, etc. satisfied by this implementation ?

Num.	Property	Explanation	M.S.T. specification
P1a	Safe advisory selection	An downward RA is never issued when an upward maneuver does not produce an adequate separation	assumes Up_Separation >= Positive_RA_Alt_Tresh && Down_Separation < Positive_RA_Alt_Tresh; ensures result == needDownward_RA;
P1b	Safe advisory selection	An upward RA is never issued when an upward maneuver does not produce an adequate separation	assumes Up_Separation < Positive_RA_Alt_Tresh && Down_Separation >= Positive_RA_Alt_Tresh; ensures result == needUpward_RA;

```

int alt_sep_test()
{
    bool enabled, tcas_equipped, intent_not_known;
    bool need_upward_RA, need_downward_RA;
    int alt_sep;

    enabled = HighConfidence && (Own_Tracked_Alt_Rate <= OLEV)
            && (Cur_Vertical_Sep > MAX_ALT_DIFF);
    tcas_equipped = (Other_Capability == TCAS_RA);
    intent_not_known = (Two_of_Three_Reports_Valid && Other_RAC == NO_INTENT);

    alt_sep = UNRESOLVED;

    if (enabled && ((tcas_equipped && intent_not_known) || !tcas_equipped))
    {
        need_upward_RA = Non_Crossing_Biased_Climb() && Own_Below_Threat();
        need_downward_RA = Non_Crossing_Biased_Descend() && Own_Above_Threat();
        if (need_upward_RA && need_downward_RA)
            // unreachable: Own_Below_Threat and Own_Above_Threat can't be both true
            alt_sep = UNRESOLVED;
        else if (need_upward_RA)
            alt_sep = UPWARD_RA;
        else if (need_downward_RA)
            alt_sep = DOWNWARD_RA;
        else
            alt_sep = UNRESOLVED;
    }

    return alt_sep;
}
    
```

EUCLIDE is a free open-source software
A web-based interface, accessible online <http://euclide.gforge.inria.fr/>

