

% Problem Instance

% types of actions

action_type(observe). action_type(downlink). action_type(uplink).

% available actions order

action(7,observe).

action(8,observe).

action(1,observe).

action(2,downlink).

action(3,observe).

action(4,observe).

action(5,uplink).

action(6,downlink).

action(9,uplink).

% visibility of task i on orbit j (decision variable)

visible(1,1,1).

visible(2,1,1).

visible(3,1,1).

visible(4,1,1).

visible(5,1,1).

visible(6,1,1).

visible(7,1,1).

visible(8,1,1).

visible(9,1,1).

% emergency tasks

emergency_task(1).

% task priorities

priority(1,2). priority(3,2). priority(4,1). priority(7,3). priority(8,1).

% action time window - available execution time

% satellite can take action i between minutes k to i

action_window(1,1,4).

action_window(2,5,7).

action_window(3,7,10).

action_window(4,8,10).

action_window(5,11,14).

action_window(6,20,23).

action_window(7,32,35).

```

action_window(8,32,34).
action_window(9,35,38).

% orbits
orbit(1).

% satellites
satellite(1,aqua).

% satellite action time consuming
sat_action_time(1, observe, 4).
sat_action_time(1, downlink, 4).
sat_action_time(1, uplink, 4).

% actual memory units busy
sat_memory(1,0,0).

% memory units available on satellite's i board
memory_storage(1,30).

% memory units usage by satellite i for each observation task
memory_use(1,10).

% actual energy units busy
sat_energy(1,0,200).

% energy units available on satellite's i board
energy_storage(1,200).

% energy units usage by satellite i for each task
energy_use(1,20).

% energy units generated by satellite i for each minute
energy_gen(1,1).

% orbit 2
orbit(2).
satellite(2,hotbird).
sat_action_time(2, observe, 2).
sat_action_time(2, downlink, 2).
sat_action_time(2, uplink, 2).
sat_memory(2,0,0).

```

memory_storage(2,60).

memory_use(2,20).

sat_energy(2,0,300).

energy_storage(2,300).

energy_use(2,10).

energy_gen(2,2).

visible(1,2,1).

visible(2,2,1).

visible(3,2,1).

visible(4,2,1).

visible(5,2,1).

visible(6,2,1).

visible(7,2,1).

visible(8,2,1).

visible(9,2,1).