```matlab
function update_lam_x(a,b,ab,pa,pb,pab)
        %update x based on event. a b and ab are cluster sizes. pa, pb and
        %pab are what has to be changed to the respective number of
        %clusters.

        global  k mu lam lam_mu lam_mu_d x norm_mu norm_m

        x(:,:,k+1) = x(:,:,k);

        if a > 0
            x(a,2,k+1) = x(a,2,k+1) + pa;
        end

        if b > 0
            x(b,2,k+1) = x(b,2,k+1) + pb;
        end

        clean = x(:,2,k+1)>0;

        x(:,1:2,k+1) = [sortrows(x(clean,1:2,k+1)) ; zeros(size(x,1)-sum(clean),2)];

        if ab > 0
            if any(x(:,1,k+1)==ab)== 1
                locab = find(x(:,1,k+1)==ab);
                x(locab,2,k+1) = x(locab,2,k+1) + pab;
            elseif any(x(:,1,k+1))==1
                locab = find(x(:,1,k+1),1, 'last')+1;
                x(locab,1:2,k+1) = [ab pab];
            else
                x(1,1:2,k+1) = [ab pab];
            end
        end

        % arrvial rates need to be determined for event k+1 based on
        % x(:,:,k+1)

        for i=1:find(x(:,1,k+1),1, 'last')
            for j=1:i
                if i == j
                    comb = 0.5*x(i,2,k+1)*(x(j,2,k+1)-1);
                    lam(i,j) = comb*bp(x(i,1,k+1),x(j,1,k+1));
                else % i \neq j
                    comb = x(i,2,k+1)*x(j,2,k+1);
                    lam(i,j) = comb*bp(x(i,1,k+1),x(j,1,k+1));
                end
            end
        end


        for i = 1:find(x(:,1,k+1),1, 'last')
            mu = norm_mu*x(i,1,k+1)^(1/3)-norm_m;
            if mu > 0
                    lam_mu(i,1) = log(1+1/(x(i,2,k+1)*x(i,1,k+1)))*mu;
            elseif mu < 0
                    lam_mu_d(i) = -log(1+1/(x(i,2,k+1)*x(i,1,k+1)))*mu;
            end
        end

end
```