

## 1. Codes

## 1.1. Code File: Ex6\_Init.m

This function is relative to Task 6. Initialization.

```
function [s, x, A, W, co, center] = Ex6_Init

load sound1.dat;
load sound2.dat;

p = numel(sound1);
s = [sound1'; sound2'];
N = 2;
A = rand(N, N);
x = A * s;

%neworder = rand(1, p);
%idx = find(neworder > 0.97);
%tmp1 = x(1, idx);
%tmp2 = x(2, idx);
%x(1, idx) = tmp2;
%x(2, idx) = tmp1;

co = corrcoef(s, x);

center = mean(x, 2);
x = x - repmat(center, [1, p]);

W = rand(N, N);

end
```

## 1.2. Code File: Ex6\_Optimization.m

Those functions are relative to Task 6. Optimization and Result.

```
function Ex6_Optimization()

close all;

learningrate = 0.001;

[s, x, A, W, co_sx, center] = Ex6_Init;

p = size(s, 2);
I = eye(2);

idx = 1;
while (idx <= p)
    tx = x(:, idx);
    twx = W * tx;
    dw = learningrate .* (I + (1 - 2 .* logisticfun(twx)) * twx') * W;
    W = W + dw;
    idx = idx + 1;
end

rs = W * x + repmat(center, [1, p]);

co_sr = corrcoef(s, rs);
```

```
figure;
subplot(3, 2, 1);
plot(s(1, :), 'b');
title('Ori: Ch.1');
axis off;
drawnow;
soundsc(s(1, :));
pause(2);
subplot(3, 2, 2);
plot(s(2, :), 'b');
title('Ori: Ch.2');
axis off;
soundsc(s(2, :));
drawnow;
pause(4);

subplot(3, 2, 3);
plot(x(1, :), 'g');
title('Mix: Ch.1');
axis off;
drawnow;
soundsc(x(1, :));
pause(2);
subplot(3, 2, 4);
plot(x(2, :), 'g');
title('Mix: Ch.2');
axis off;
drawnow;
soundsc(x(2, :));
pause(4);

subplot(3, 2, 5);
plot(rs(1, :), 'r');
title('ICA: Ch.1');
axis off;
drawnow;
soundsc(rs(1, :));
pause(2);
subplot(3, 2, 6);
plot(rs(2, :), 'r');
title('ICA: Ch.2');
axis off;
drawnow;
soundsc(rs(2, :));
pause(4);

disp('corelation s and x');
disp(co_sx);
disp('corelation s and rs');
disp(co_sr);

end

% f''/f' = 1 - 2f
function [value] = logisticfun(t)
value = 1 ./ (1 + exp(-t));
end
```

II Output Graphics and Data

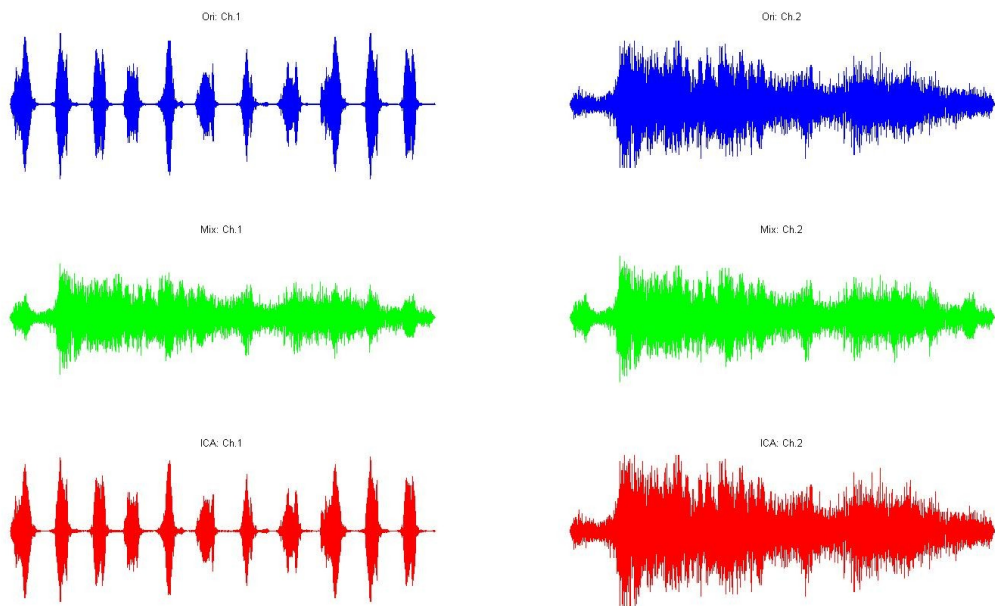


Figure 01

Output data:

```

correlation s and x
1.0000 0.7180
0.7180 1.0000

correlation s and rs
1.0000 0.2252
0.2252 1.0000
    
```