```
function prob_mat = generate_S_mat_distribution(S_mat)

S_vector = S_mat(:)';

[N x] = size(S_mat);

prob_mat = zeros(N,N);

for i = 1 : N

  for j = 1 : N

    prob_mat(i,j) = sum(S_mat(i,j) > S_vector)/N^2;

  endfor

endfor

endfunction
```