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## Audio Application

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```
N = 20;
```

### Create two ordered sequences in time.

---

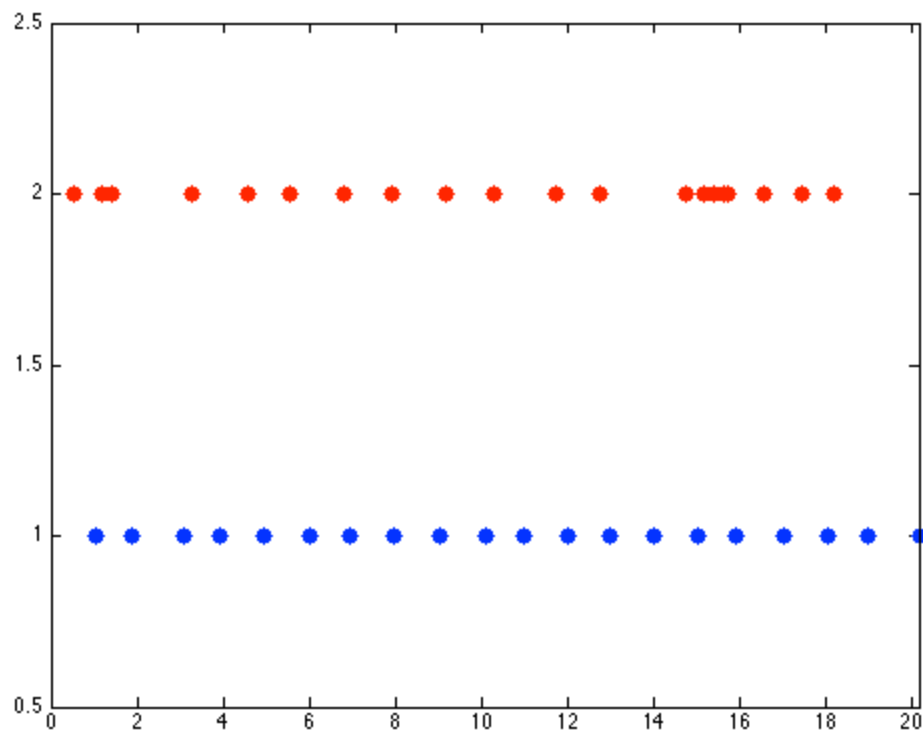
We'll let  $r$  be more or less regularly spaced, and  $q$  be a somewhat more irregularly spaced sequence.

```
r = (1:20)' + 0.1*randn(N,1);  
q = cumsum(2*rand(N,1));
```

### Plot q and r

---

```
plot(r,1*ones(N,1), 'b.', q,2*ones(N,1), 'r.', 'MarkerSize',25);  
axis([0 max([q;r]) 0.5 2.5]);
```



## Compute a least squares interpolation

```
% Create D2
D = [eye(N-1),zeros(N-1,1)] - [zeros(N-1,1),eye(N-1)];
D2 = D'*D;

% Solve for interpolate for various values of alph
I = eye(N);

hold on;

for phi = 0.01:0.01:0.99;
    alpha = phi/(1-phi);
    sopt = (I+alpha*D2)\(r+alpha*D2*q);
    plot(sopt,(1+phi)*ones(N,1),'k.','Markersize',8);
end

hold off
```

