

the squared in eq. (4)

$$A(t, f) = A'^2(t, f) = \frac{AS^2(f_s, t_s)}{2\pi h r'(t)} e^{-2\alpha(f)r'(t)},$$

$$A(t, f) = A'^2(t, f) = \frac{AS^2(f_s, t_s)}{2\pi h (R - |r'(t)|)} e^{-2\alpha(f)R} e^{2\alpha(f)r(t)}$$

$$A(t, f) = K'(t, f) e^{\beta' t},$$

identifying the terms between theoretical and real spectrograms

$$K'(t, f) = \frac{AS^2(f_s, t_s) e^{-2\alpha(f)R}}{2\pi h (R - |r'(t)|)}$$

$$\beta' = \beta = 2\alpha(f) v_m(t)$$

$$A(t, f) = K'(t, f) e^{\beta' t},$$

$$f(t) = b + at$$

$$F'(t, f) = \ln K'(t, f) + \beta'(t, f) t$$

$$F'(t, f) = \ln K + \beta t$$