Contents

```matlab
function a = zoom(q_eval, q_grad, p_k, alpha_0, alpha_1)
```

ZOOM Introduction

```
    Interpolates previous two estimates for alpha, reducing the
    search interval for alpha.

q_eval: function handle with respect to alpha for
        q_eval(alpha) = f_eval(x_k + alpha * p_k)

q_grad: function handle with respect to alpha for
        q_grad(alpha) = f_grad(x_k + alpha * p_k)

a_0:    previous estimate for alpha

a_1:    current estimate for alpha
```

```matlab
    a_0 = alpha_0;
    a_1 = alpha_1;

    d1 = p_k' * (q_grad(a_0) + q_grad(a_1)) - 3 * ...
        (q_eval(a_0) - q_eval(a_1)) / (a_0 - a_1);

    d2 = (a_1 - a_0) / abs(a_1 - a_0) * ...
        (d1^2 - q_grad(a_0)' * q_grad(a_1))^(1/2);

    a = a_1 - (a_1 - a_0) * (p_k'*q_grad(a_1) + d1 + d2) / ...
        (p_k' * (q_grad(a_1) - q_grad(a_0)) + 2 * d2);

end
```