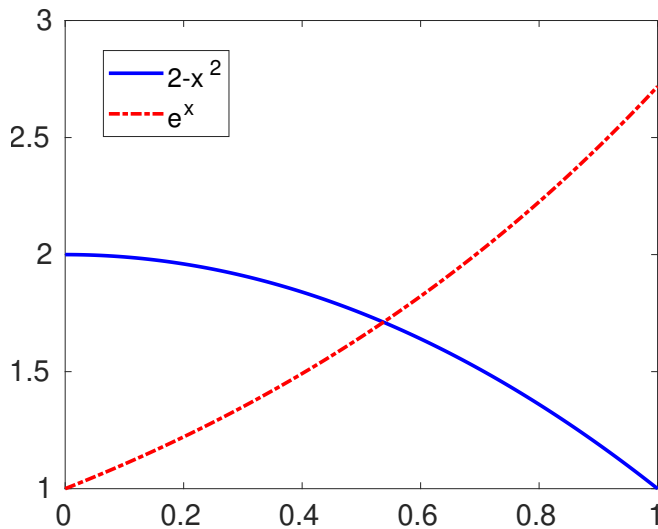


several fixed point iterations

- goal: find the positive root of $2 - x^2 - e^x = 0$
- 2 possible fixed point formulations:

$$x = \sqrt{2 - e^x} =: \Phi_1(x), \quad x = \ln(2 - x^2) =: \Phi_2(x),$$

- $|\Phi_1'(x^*)| \approx 1.5 > 1$, $|\Phi_2'(x^*)| \approx 0.31 < 1$.



| n | $x_{n+1} = \Phi_1(x_n)$ | $x_{n+1} = \Phi_2(x_n)$ |
|---|------------------------------|-------------------------|
| 0 | 0.592687716508341 | 0.559615787935423 |
| 1 | 0.437214425050104 | 0.522851128605001 |
| 2 | 0.672020792350124 | 0.546169619063046 |
| 3 | 0.204473907097276 | 0.531627015197373 |
| 4 | 0.879272743474883 | 0.540795632739194 |
| 5 | stop: ($2 - e^{0.87} < 0$) | 0.535053787215218 |
| 6 | | 0.538664955236433 |
| 7 | | 0.536399837485597 |
| 8 | | 0.537823020842571 |
| 9 | | 0.536929765486145 |