trans.char Transient response characteristics

We define four transient response characteristics, all defined in terms of a system's **step input response**. For the following, please refer to the illustration in Fig. char.1.

step response

1. The **rise time** T_r is the duration from the time the response reaches 10 % to the time it reaches 90 % of its final value.
2. The **peak time** T_p is the time at which the response reaches its first or maximum peak.[1]
3. The **percent overshoot** %OS expresses the amount the response overshoots its steady-state value, expressed as a percentage of the steady-state value.
4. The **settling time** T_s is the time at which the response reaches, and thereafter remains within, ±2 % of its steady-state value.[1]

rise time

peak time

1. This definition assumes the step input occurs at t = 0. Otherwise, subtract the nonzero initial time.

percent overshoot

settling time

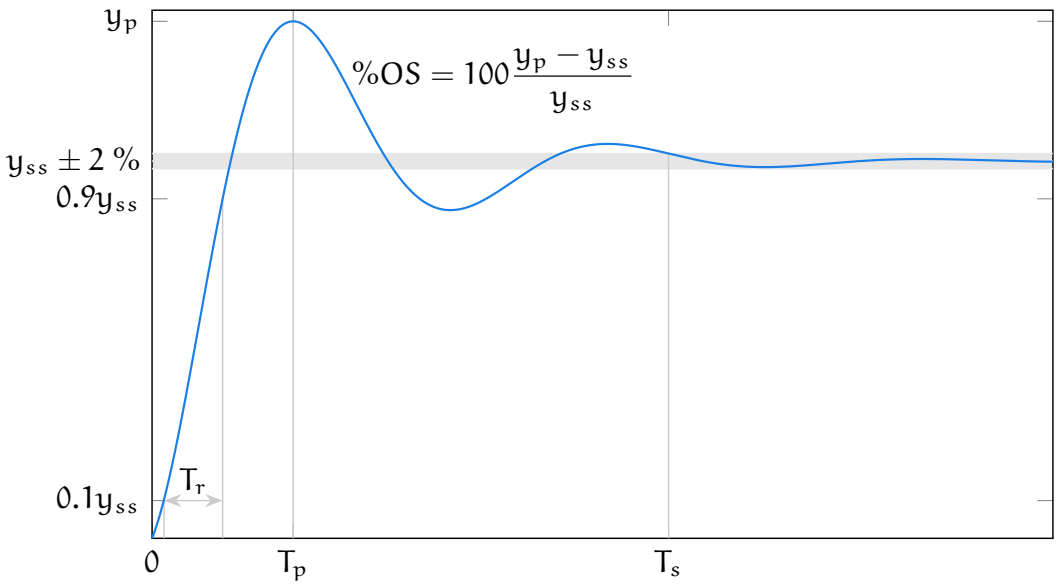

Figure char.1: transient response characteristics rise time T_r, peak time T_p, percent overshoot %OS, and settling time T_s in terms of a response's steady-state y_{ss} and peak y_p.