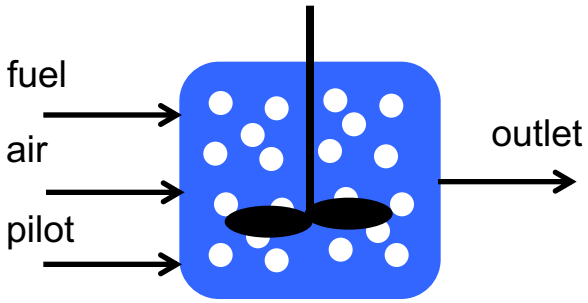
PMSR



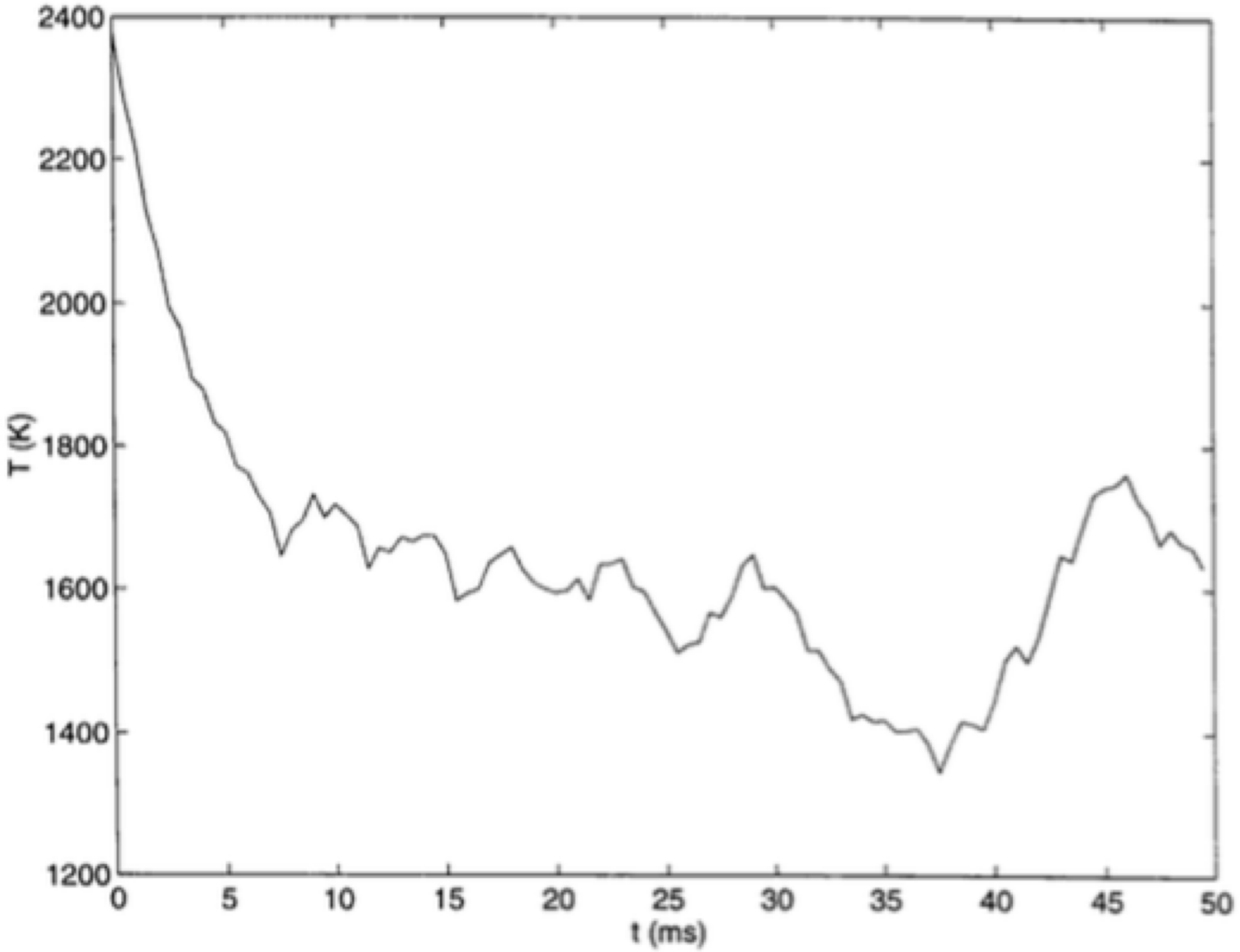
- Pairwise mixed stirred reactor
- Streams: Air, Fuel, (Pilot), Outlet
- More generic mixing than a PSR
- Create a system of notional particles: N
- The particles are paired up in the reactor (p,q) and mix and react:

$$\frac{d\phi_q}{dt} = \frac{(\phi_p - \phi_q)}{\tau_{mix}} + S_q$$

$$\frac{d\phi_p}{dt} = \frac{(\phi_q - \phi_p)}{\tau_{mix}} + S_p$$

- We step in time with stepsize Δt. At each step
  - Replace $N_{io}=(1/2)N\Delta t/\tau_{res}$ pairs with the inlet stream compositions (in the ratio of the mass flow of those streams
  - Select $N_{pair}=(1/2)N\Delta t/\tau_{pair}$ pairs to switch partners (different than the i/o pairs)
  - Shuffle/repair the N_{io} and N_{pair} particles

Mean Temperature



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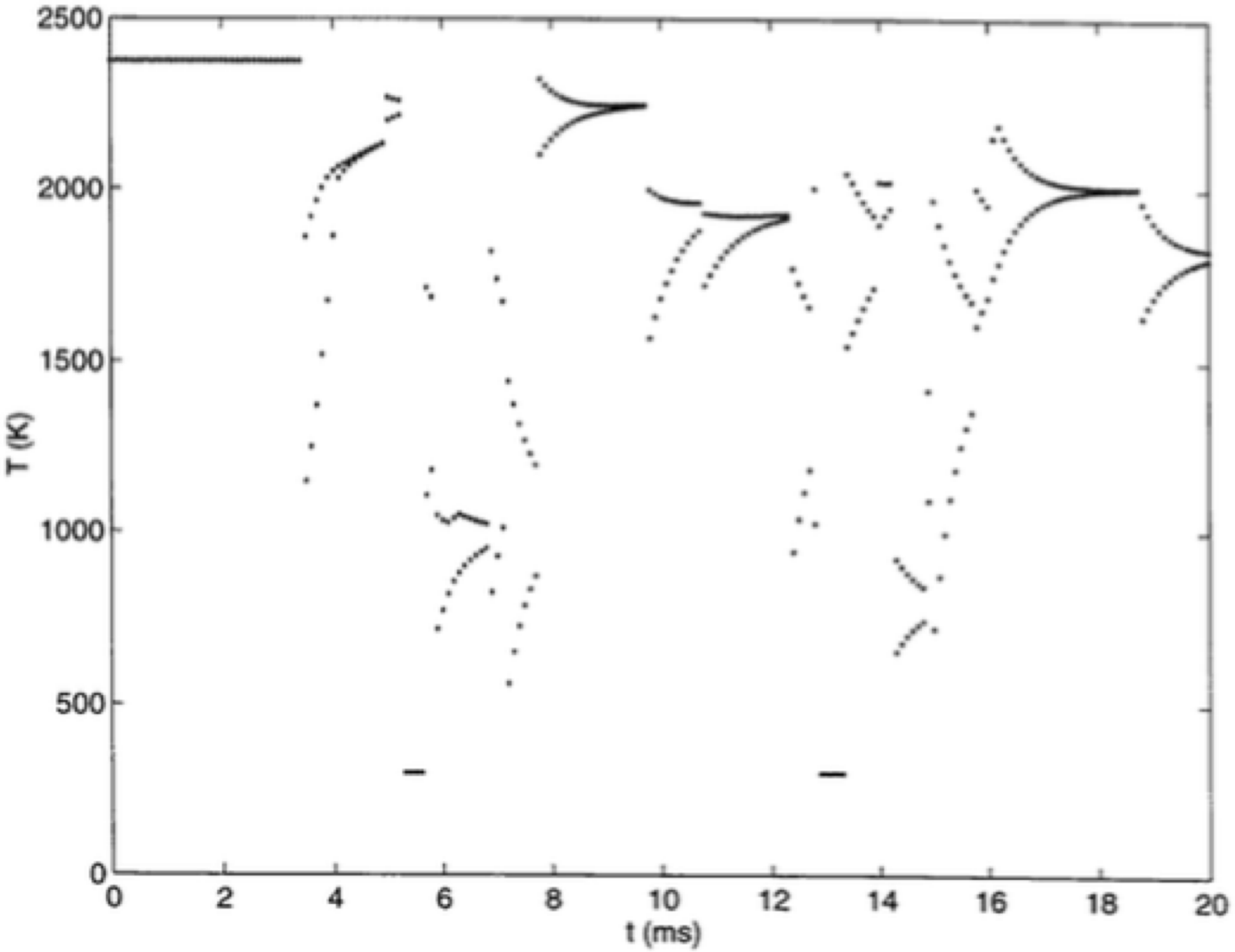
Single Pair Temperature



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PMSR Code Example

- H_2-O_2 flame
- 1000 particles
- Δt = 0.1 ms
- $\tau_{mix}=\tau_{pair}$=1 ms