A Workload-oriented Programming Model for Temporal Isolation with VBS

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joint work with
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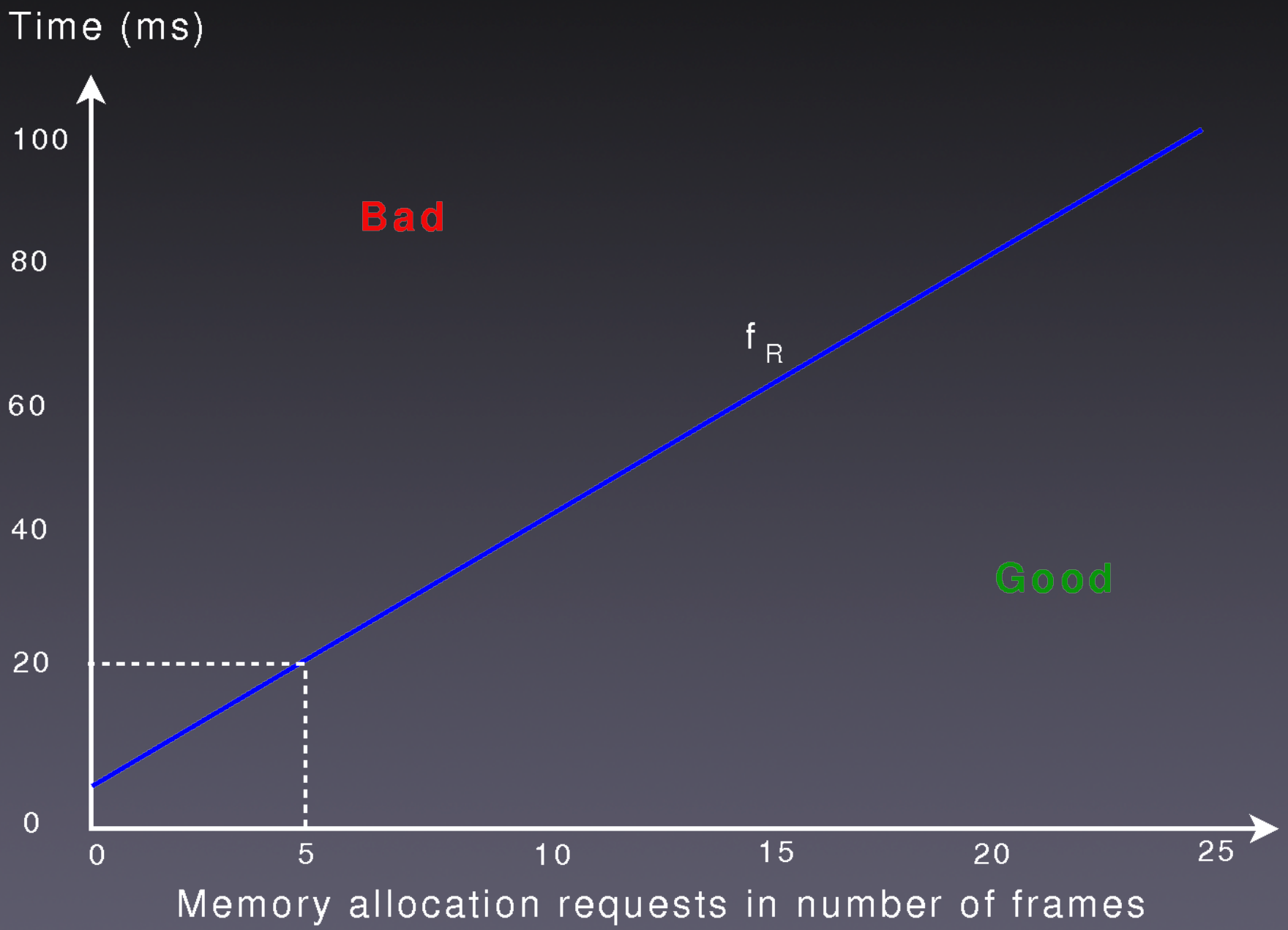
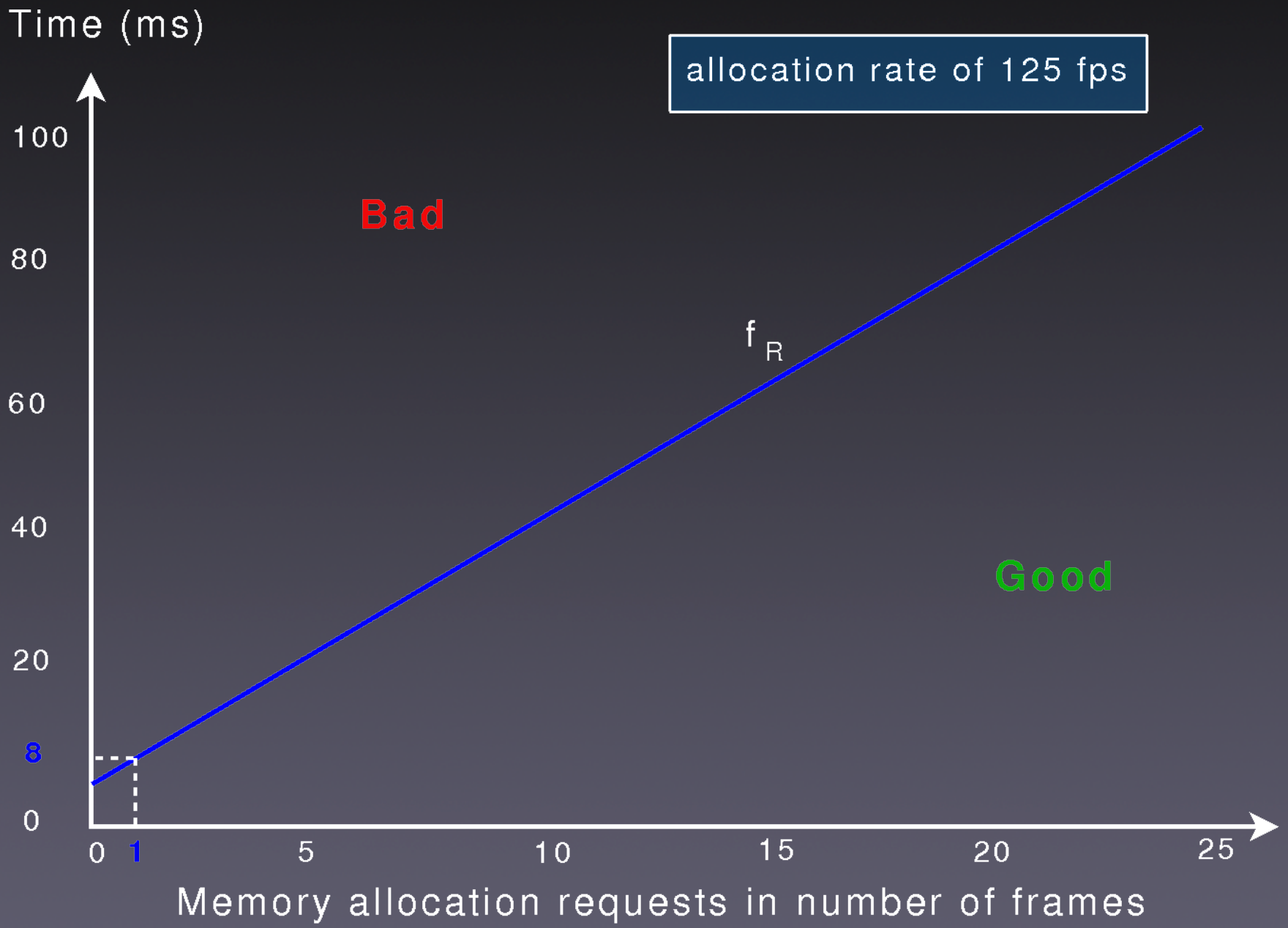
How do we get VBS parameters for an action?

“server design problem”

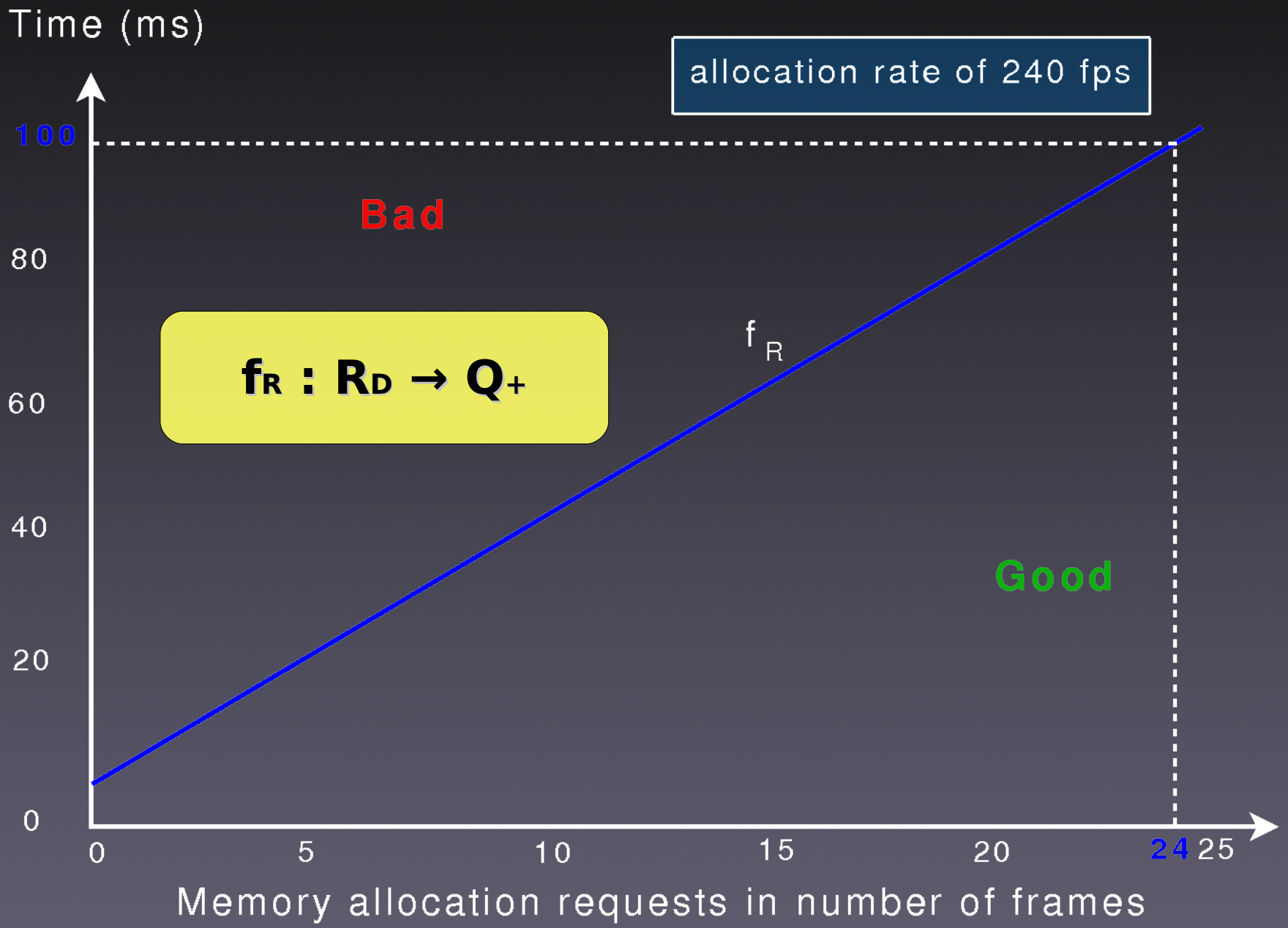
Response-time function



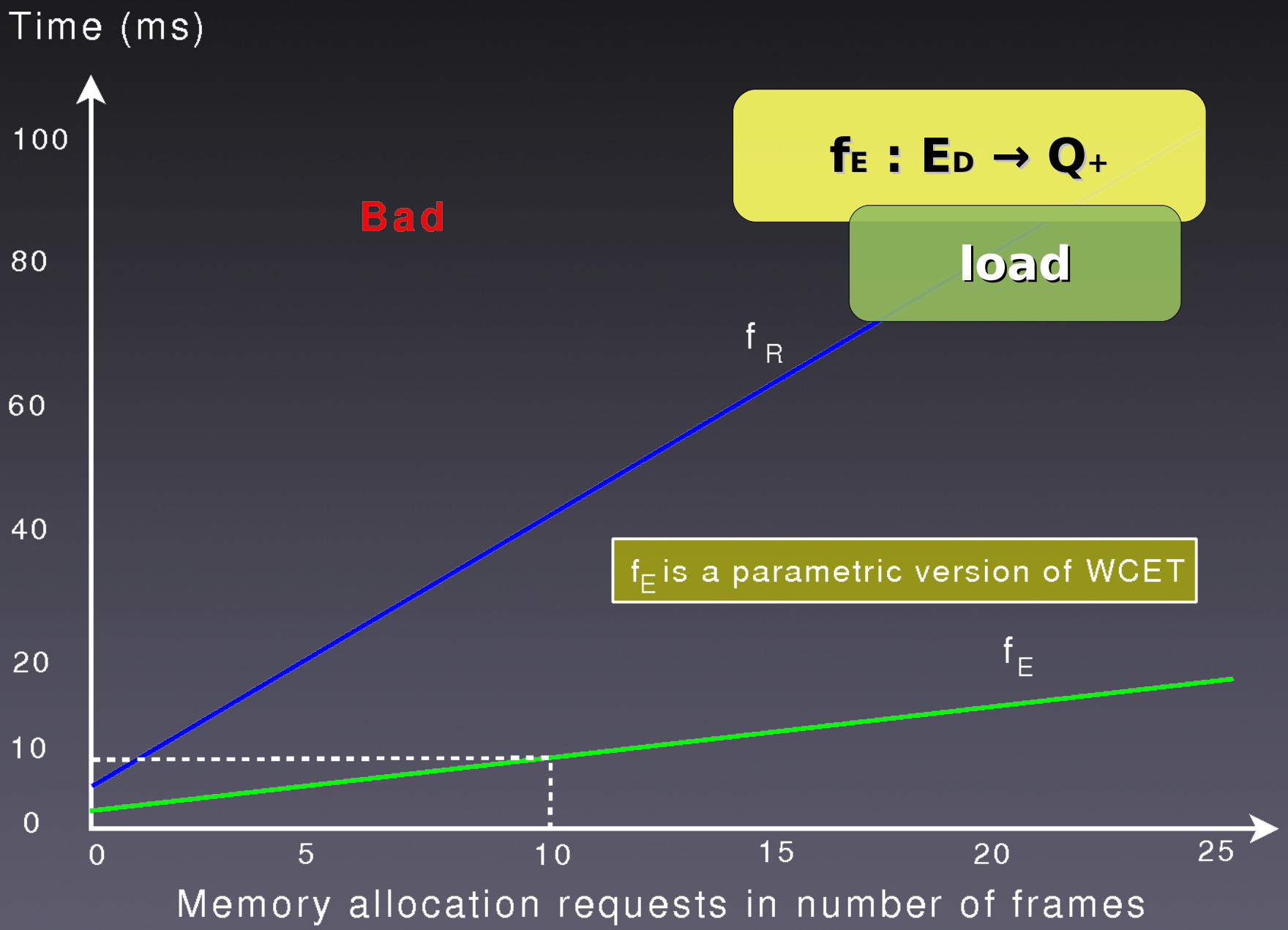
Response-time function



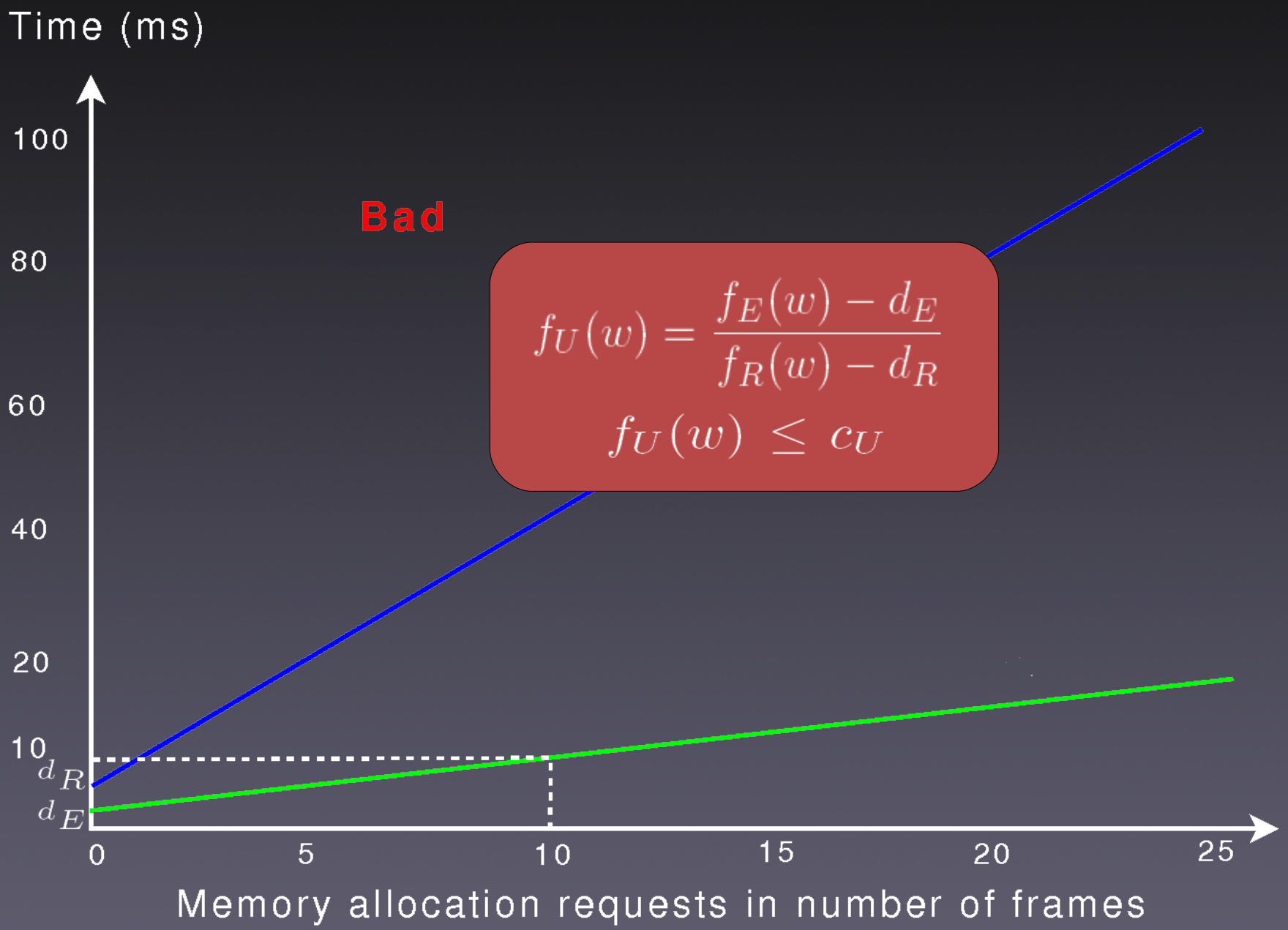
Response-time function



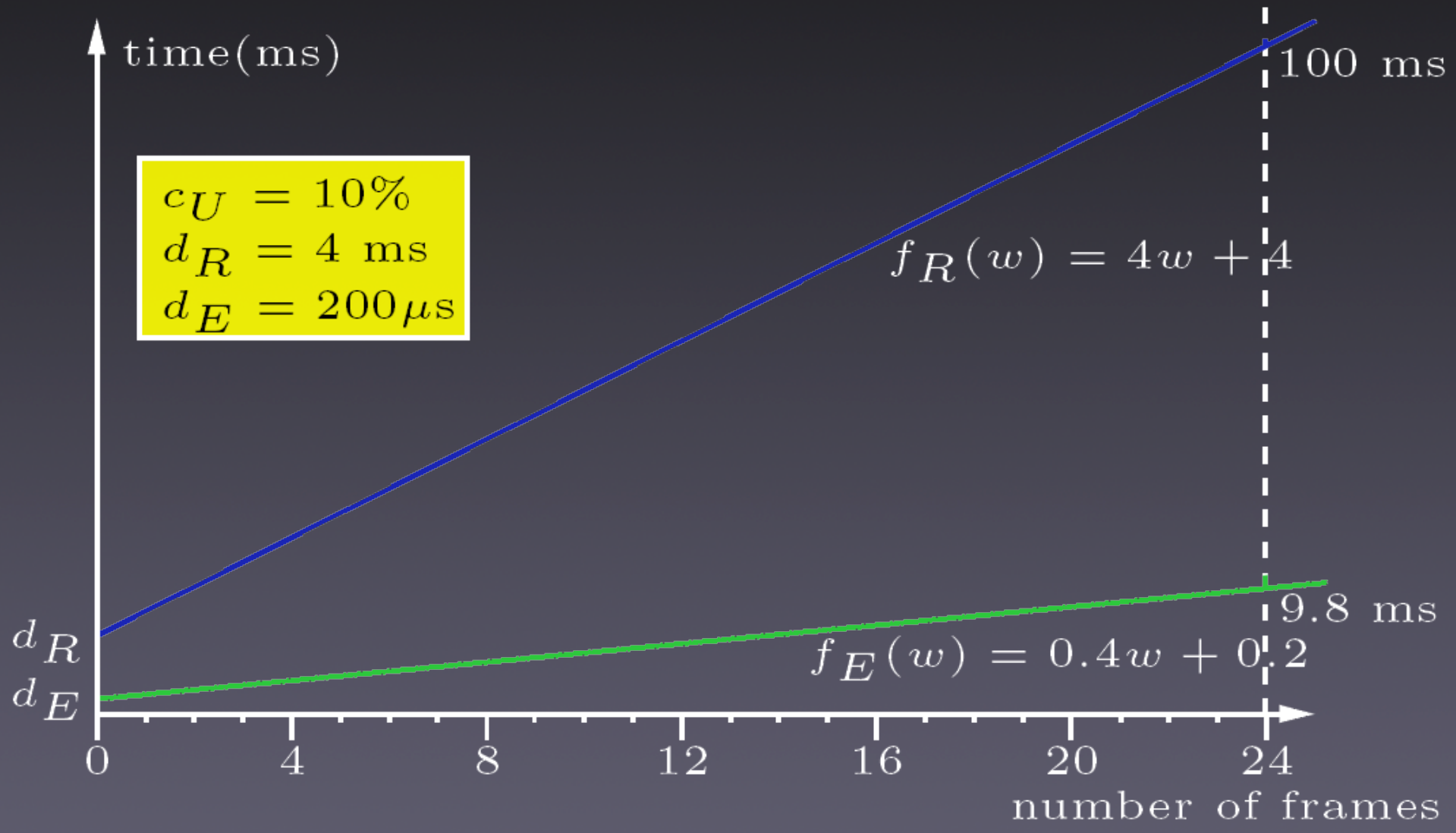
Execution-time function



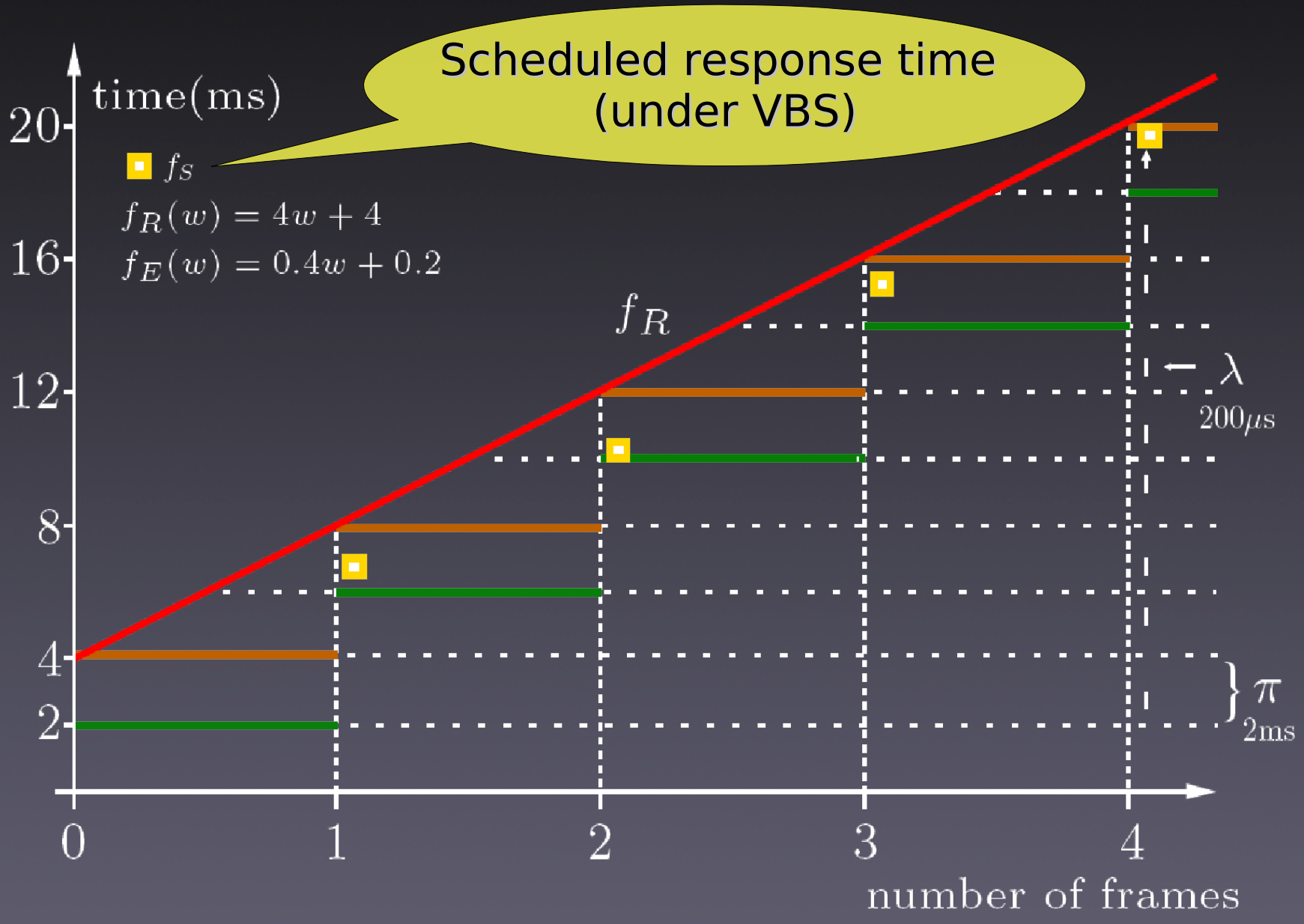
Utilization



Timing of the allocate_memory action



Response-time sampling



Server Design Problem

Finding the right λ,π is difficult.

For $f_S(w) \leq f_R(w)$ one can choose π as follows:

- $0 < \pi < d_R - d_E / c_U$
- π divides d_R evenly
- π divides $f_R(w) - d_R$ evenly or

  λ divides $f_E(w) - d_E$ evenly

$\lambda = \pi * c_U$

Server Design Problem

Smallest π possible:

- f_S approximates f_R best 
- less response-time jitter 
- increased scheduler overhead 

Scheduler overhead accounting:

- utilization accounting 
- response-time accounting 
- combined accounting

Higher-level scheduler:

- small period for the first part of an action
- large period for the remaining part

Conclusion

For scheduling processes in temporal isolation:

- Programming model as a link to VBS
- VBS provide predictability
- Server design for better performance

http://tiptoe.cs.uni-salzburg.at/