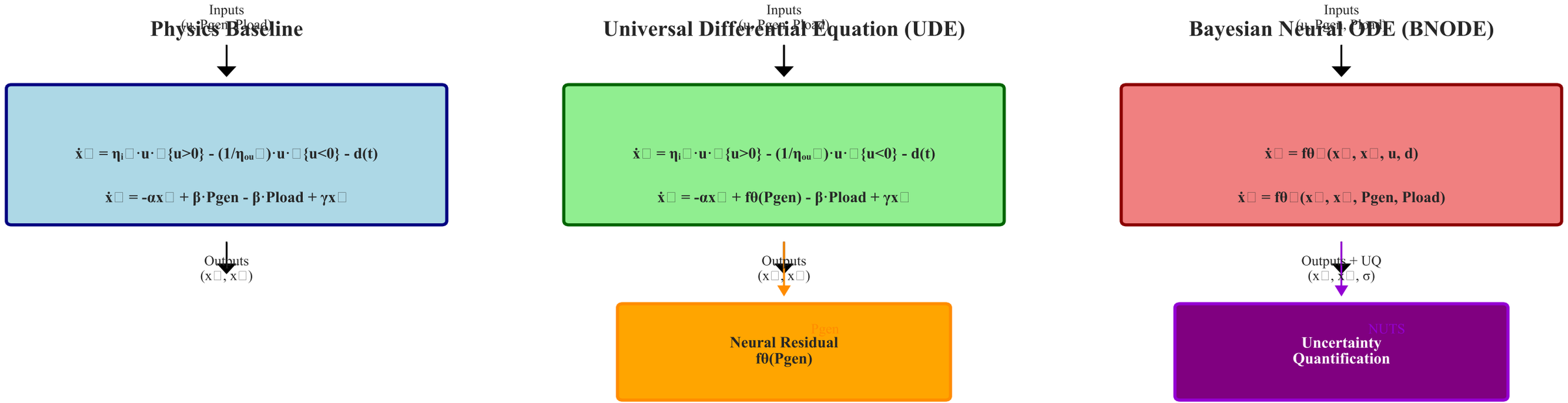
Model Architecture Comparison
Physics Baseline
Inputs
(u, Pgen, Pload)
ẋ□ = ηᵢ□·u·□{u>0} - (1/η_ou□)·u·□{u<0} - d(t)
ẋ□ = -αx□ + β·Pgen - β·Pload + γx□
Outputs
(x□, x□)
Universal Differential Equation (UDE)
Inputs
(u, Pgen, Pload)
ẋ□ = ηᵢ□·u·□{u>0} - (1/η_ou□)·u·□{u<0} - d(t)
ẋ□ = -αx□ + fθ(Pgen) - β·Pload + γx□
Outputs
(x□, x□)
Pgen
Neural Residual
fθ(Pgen)
Bayesian Neural ODE (BNODE)
Inputs
(u, Pgen, Pload)
ẋ□ = fθ□(x□, x□, u, d)
ẋ□ = fθ□(x□, x□, Pgen, Pload)
Outputs + UQ
(x□, x□, σ)
NUTS
Uncertainty
Quantification