The core temperature depends on the following parameters:

- 1.operating frequency
- 2.cpu utilization
- 3.room temperature
- 4.cpu case air flow

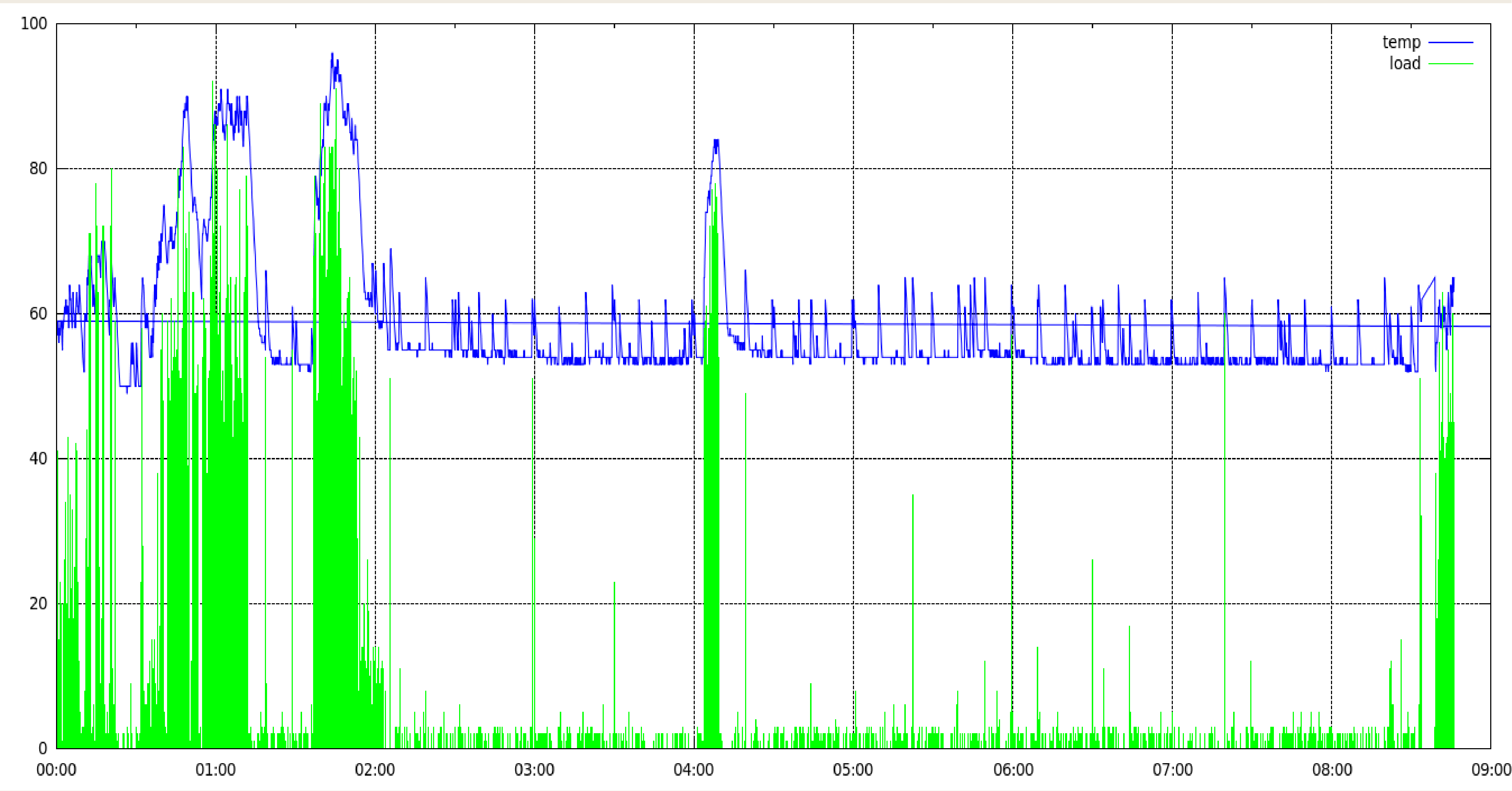

Fig: Load vs Temp (single core)

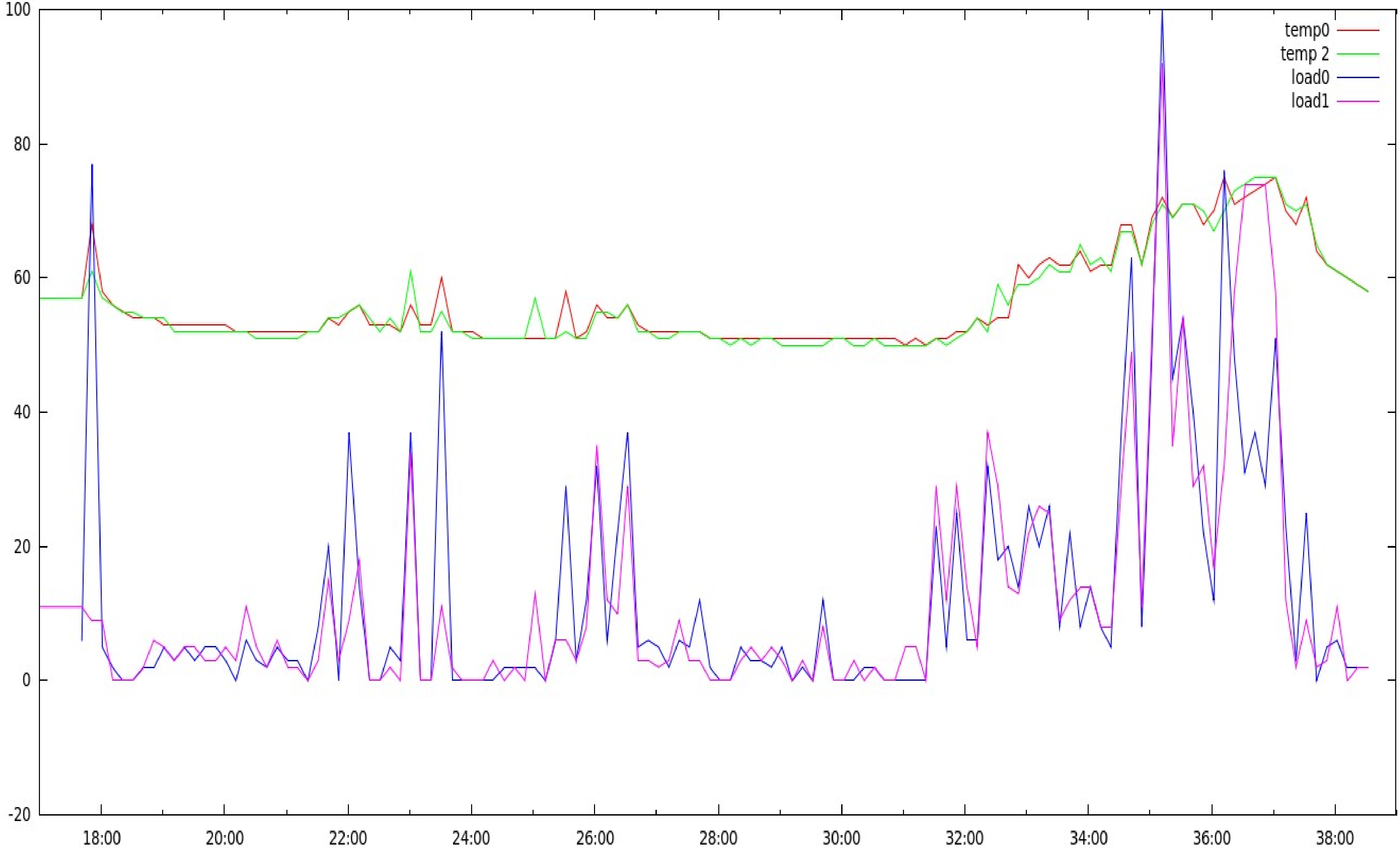

Fig: Load vs Temp (dual core)

The model used for prediction of cpu temperature using cpu load :

The system temperature is affected by both core temperature and application temperature

Given by equation :

$$Tpredict = wsTapp + wlTcore$$

Here

Ws=0.7

Wl=0.3

T app is calculated using linear regression using the equation

Tapp =0.23*(load) + 53

And Tcore is calculated using the equation given in **Predictive Dynamic Thermal Management for Multicore Systems** i.e

$$T(t) = Tss - (Tss - Tinit) \times e - bt$$

Here Tss is steady state temperature (which equal to the temperature attained when a process is repeated infinitely) 68c

B=0.009

T=10

Fig: Actual vs Predicted Temp (core 0)

Fig: Actual vs Predicted Temp (core 1)

The model used for prediction of cpu temperature using cpu load :

The system temperature is affected by both core temperature and application temperature

Given by equation :

$$Tpredict = wsTapp + wlTcore$$

Here

Ws=0.788

Wl=0.191

T app is calculated using non-linear regression using the equation

Tapp =0.316*(load) + 52-1.171*exp(-39*load)

And Tcore is calculated using the equation given in **Predictive Dynamic Thermal Management for Multicore Systems** i.e

$$T(t) = Tmax - (Tmax - Tmin) \times e - b*(load)$$

Here Tss is steady state temperature (which equal to the temperature attained when a process is repeated infinitely) 68c

B=0.03646

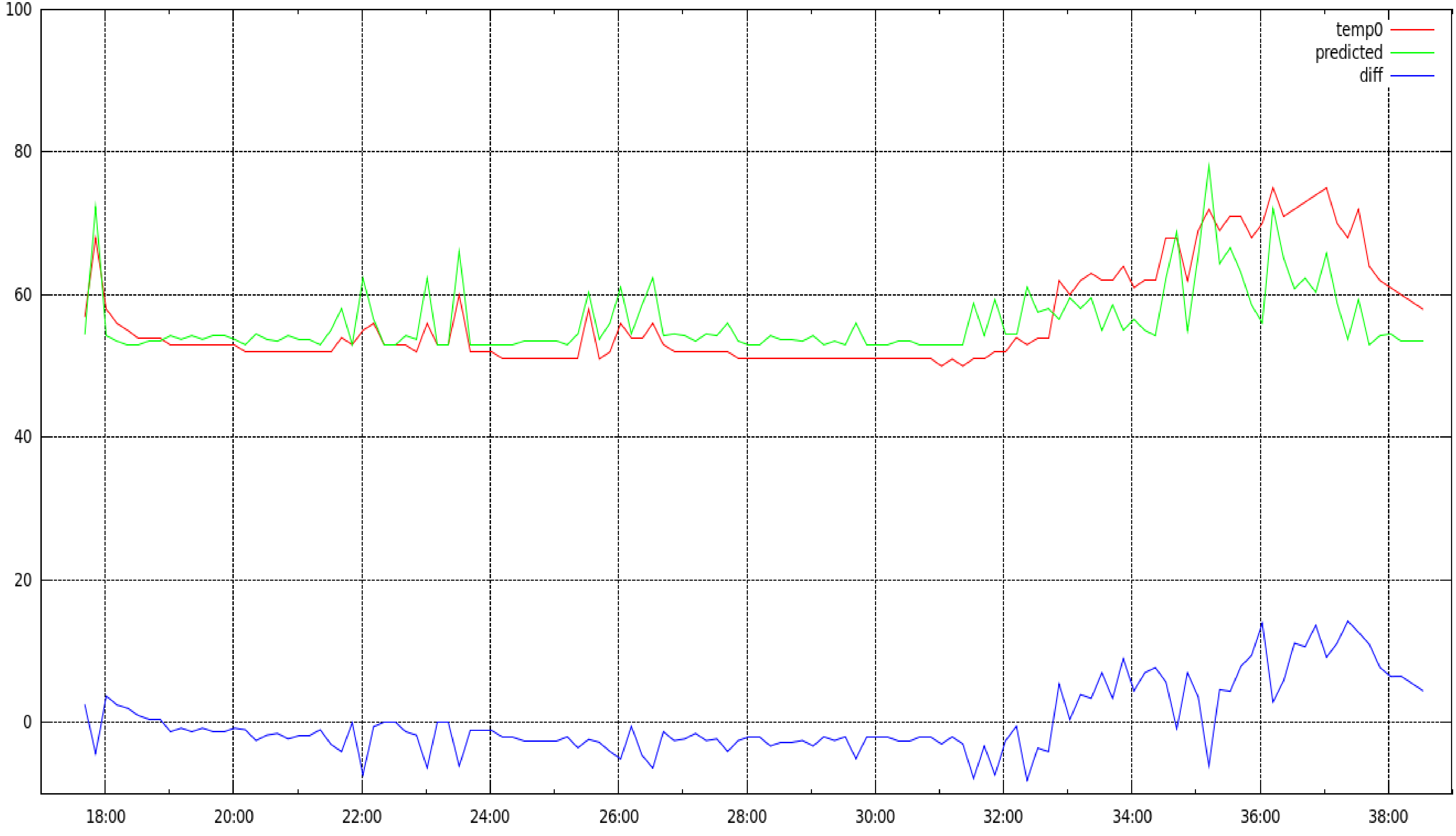

Fig: Actual vs Predicted Temp (core 0)

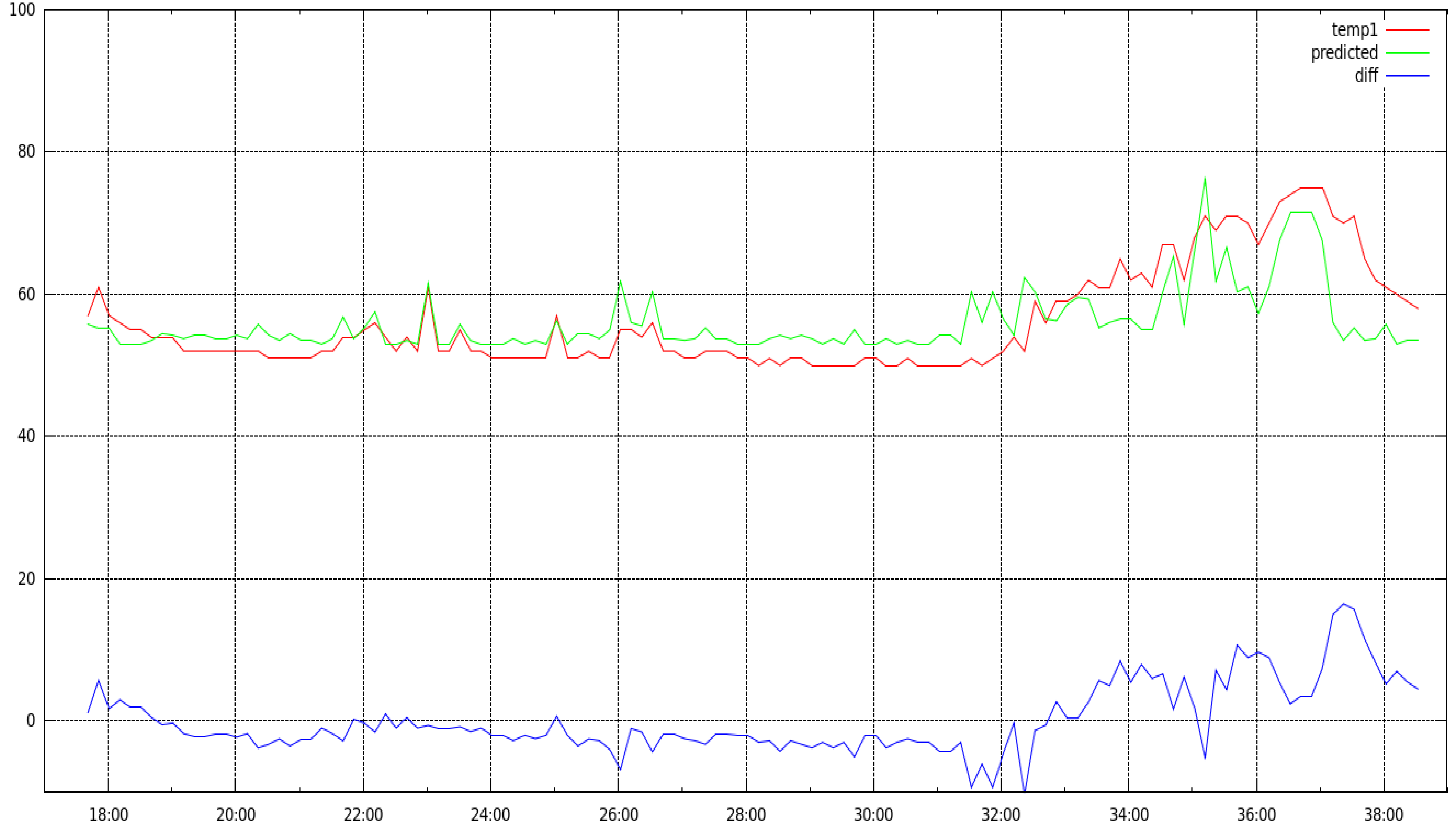

Fig: Actual vs Predicted Temp (core 0)

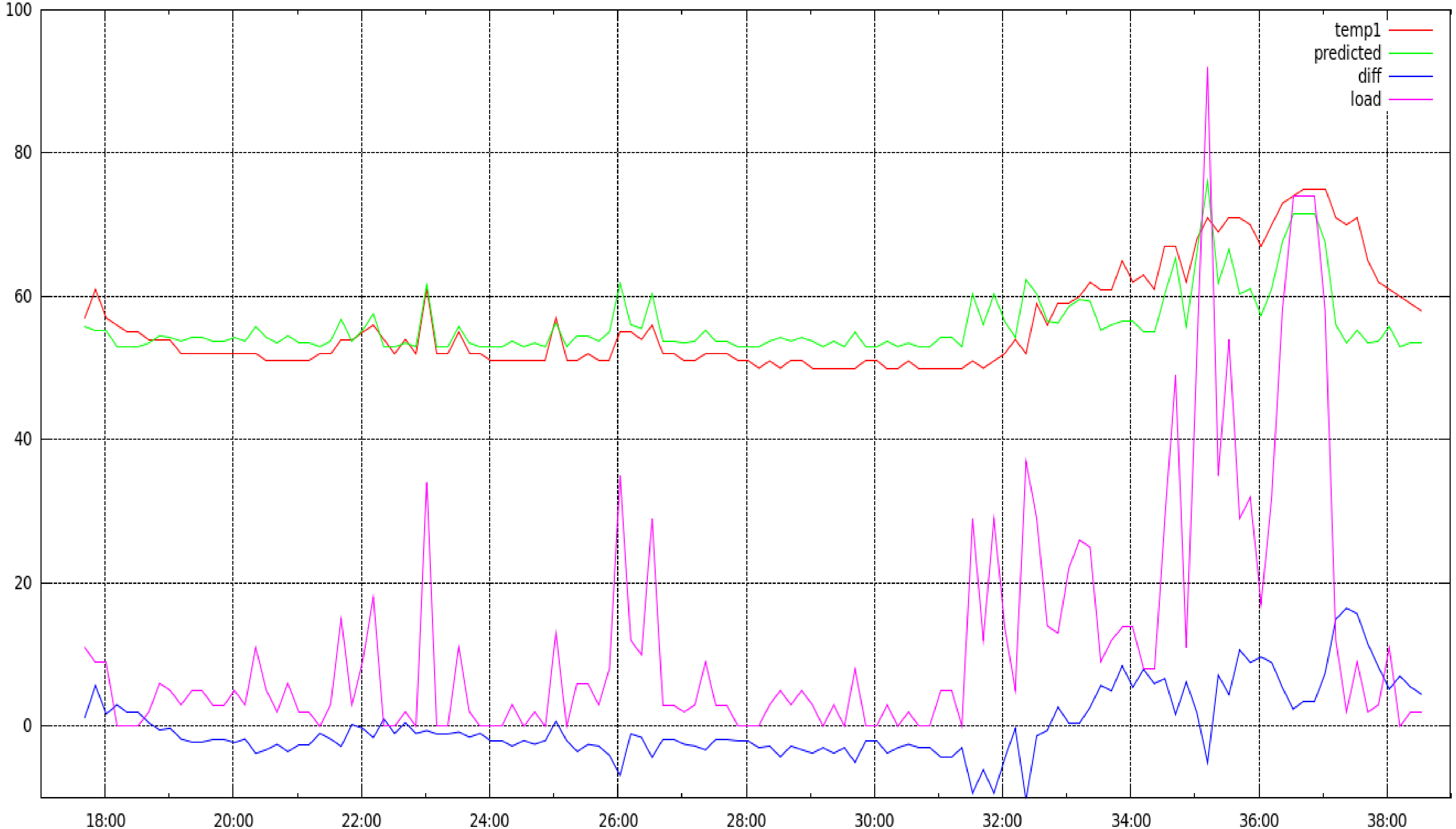

Fig: Actual vs Predicted Temp with load(core 1)